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A Systematic Study of the Genera *Adapsilia* and *Parageloemyia* in Korea (Diptera, Tephritoidea, Pyrgotidae)

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Abstract Korean species of the genera *Adapsilia* Waga and *Parageloemyia* Hendel are taxonomically investigated. So far, members of Pyrgotidae are known as internal parasites of adult scarabaeoid beetles, but host relationships of the above two genera are not known yet. Based on the Korean specimens of these genera, adult external structures, including genitalia of both sexes, are described and illustrated. As a result, we recognized the following 10 species previously unknown in Korea: *Adapsilia breviantenna* sp. nov.; *A. coarctata* Waga; *A. cornugaster* sp. nov.; *A. hispida* sp. nov.; *A. longicaudata* sp. nov.; *A. longifasciata* sp. nov.; *A. ochrosoma* sp. nov.; *A. tenebrosa* sp. nov.; *Parageloemyia nigrofasciata* (Hendel); and *P. wonjuensis* sp. nov. In addition, we provided a key to the all 14 Korean pyrgotid species and conducted a cladistic analysis to infer phylogenetic relationships among them.

Key words Taxonomy, Diptera, Pyrgotidae, *Adapsilia*, *Parageloemyia*, cladistic analysis, Korea

INTRODUCTION

Members of Pyrgotidae are known as internal parasites of adult scarabaeoid beetles, but host relationships of the genera *Adapsilia* and *Parageloemyia* are not known yet. In this study, adult external structures, including genitalic structures of both sexes, are described and illustrated for the 10 newly discovered Korean species (including 8 new species) representing these two genera. In addition, we provided a key to the all known 14 Korean pyrgotid species and conducted a cladistic analysis to infer phylogenetic relationships among them.

The genus *Adapsilia* was erected by Waga (1842) based on the type species, *A. coarctata* Waga. Since then, there has been a great confusion in delimiting this genus. At present, there is still no adequate generic diagnostic character, but, instead, the genus *Adapsilia* is loosely defined not having derived characters of other pyrgotid genera. Despite its uncertain taxonomic status, there have been a number of species so far recognized under this genus. Therefore, this genus apparently is non-monophyletic. A total of 37 species of *Adapsilia* have been recognized from the following biotic regions; 4 Afrotropical, 3

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Australasian, 17 Oriental, and 13 Palaearctic species. In the present study, we discovered eight Korean *Adapsilia* species, among which seven were new to science. They include *A. hispida*, sp. nov., which was erroneously treated as *Eupyrgota fusca* by Kim (1987 - first record of Korean Pyrgotidae). The genus *Eupyrgota* has often been treated as a synonym of *Adapsilia*, but we followed Chen (1947) and Shi's (1996) definition of *Adapsilia* excluding *Eupyrgota*. *Eupyrgota* is definable based on clear diagnostic characters (Kim and Han, 2000).

The genus *Parageloemyia* was erected by Hendel (1934) based on *P. quadriseta* (Hendel) and *P. nigrofasciata* (Hendel). Hendel (1933) previously described these two species under the genus *Geloemyia*, but later separated them by having the two pairs of scutellar setae and three pairs of dorsocentral setae. Since then, Shi (1996) described an additional species, *P. globa*, from Yunnan Province, China. Hendel (1934), Enderlein (1942), and Chen (1947) pointed out that both *Geloemyia* and *Parageloemyia* were distinguished from any other pyrgotid genera by having the macrotrichiae on vein R4+5. In this study, we recognized *P. nigrofasciata* and *P. wojuensis*, sp. nov., in Korea. *P. wonjuensis* does not have the macrotrichiae on vein R_{4+5} but we included it in this genus based on our phylogenetic analysis (see "Phylogenetic Relationships").

The morphological terminology and interpretations used in this study follow mostly White *et al.* (1999). The terminology for the thoracic stripes follow Stolzfus (1988): AS: anterior submesal spot; SSS: submesal stripe; AD: anterior dorsocentral stripe; DS: dorsocentral stripe; AL: alar stripe. The ratios and lengths used in the descriptions mostly follow Han (1996): aristal-antennal ratio (aristal length / antennal length excluding arista); eye ratio (shortest eye diameter / longest eye diameter); first flagellomere-pedicel ratio (first flagellomere length / pedicel length); frontal-head ratio (width of frons / width of head in dorsal view); genal-eye ratio (genal height / longest eye diameter); wing-thorax ratio (wing length / thorax length); vein M ratio (length of section between BM-Cu and R-M / length of section between R-M and DM-Cu); vein R_{4+5} ratio (length of section between R-M and apex / length of section between basal node and R-M); antennal length (base of pedicel - apex of first flagellomere, including scape); mesonotum length (anterior margin of scutum - posterior margin of scutellum); wing length (anterior margin of tegular - apex of vein R_{4+5}).

PAUP (version 4.0b - Swofford, 2001) software was used to construct a cladogram of the Korean pyrgotid species. The methods for the cladistic analysis were explained in the appropriate section.

Collection abbreviations are as follows: Center for Insect Systematics, Kangwon National University, Korea (CIS); Department of Biology, Gyeongsang National University, Korea (KSUJ); Department of Biology, Korea University, Seoul (KUS); Department of Crop Protection, National Institute of Agricultural Science and Technology, Korea (NIAS); Sungshin Women's University, Korea (SSUK); University of Inchon, Korea (UIB); United States National Museum of Natural History, USA (USNM); Yonsei University Wonju campus, Korea (YSUW); Department of Biology, Yeungnam University, Korea (YUK).

PHYLOGENETIC RELATIONSHIPS

Among the nine families of the superfamily Tephritoidea, the families Tephritidae and Tachiniscidae

were considered as the closest relatives of Pyrgotidae (McAlpine, 1989). More recently, Tachiniscinae was regarded as a subfamily of Tephritidae (Korneyev, 2000). Therefore, we selected the family Tephritidae (sensu lato) as an outgroup for a cladistic analysis of Korean Pyrgotidae. Since many characters we used in the analysis were also variable within Tephritidae, the evolutionary polarities for some characters were determined by surveying the general character state distribution. Among the following 21 characters used, ancestral state were determined for 12 characters (marked with "*"; in these cases, state a is considered plesiomorphic).

Character 1*. Oviscape: (a) without apicoventral hooks; (b) with a pair of apicoventral hooks. State b is a unique state found only within Pyrgotidae.

Character 2*. Bare area on midfemur in female: (a) absent; (b) present. State b is a unique state found only within Pyrgotidae.

Character 3*. Vein Sc: (a) not completely reaching vein C; (b) apparently fused to vein C. State a is consistently found in the outgroup.

Character 4*. Subcostal break: (a) present; (b) absent. State a is consistently found in the outgroup.

Character 5*. Row of short and strong ventral spines on apical half of femora: (a) absent; (b) present. State b is much less common within the outgroup.

Character 6. 1st flagellomere: (a) short (at most 2x as long as wide; length measured dorsally); (b) long (at least 2.5x as long as wide). Polarity is not determined because it is highly variable within the outgroup.

Character 7*. Acrostichal seta: (a) present; (b) absent. Acrostichal setae are present in most tephritid taxa.

Character 8*. Scutellar seta: (a) 2 pairs; (b) basal pair reduced or absent; (c) 3 or more pairs. State a is most common within the outgroup Tephritidae.

Character 9. Dark brown spots or markings on face: (a) absent; (b) present. Polarity is not determined because facial markings are usually highly variable within the outgroup Tephritidae.

Character 10. Brown to dark brown genal streak: (a) absent; (b) present. Polarity is not determined because genal markings are usually highly variable within the outgroup Tephritidae.

Character 11*. Genal seta: (a) present; (b) absent. Genal seta is present in most tephritid taxa.

Character 12*. Spurious vein on R_{2+3}: (a) absent; (b) present. Suprious vein is only rarely found within the outgroup Tephritidae.

Character 13*. Sternite 1+2 and 3 in male: (a) without dense black lateral setulae; (b) with dense black lateral setulae. State b is unique within Pyrgotidae.

Character 14*. Number of spermathecae: (a) 3; (b) 2. State a is more common within the outgroup Tephritidae.

Character 15*. T-shaped spermatheca: (a) absent; (b) present. State b is a unique state found only within Pyrgotidae.

Character 16*. Long and slender basal ventral seta on femur: (a) absent; (b) present. State b is rarely observed within the outgroup Tephritidae.

Character 17. Orbital seta: (a) 2 pairs; (b) 1 pair. This character is highly variable within Tephritidae.

Character 18*. Inner area of inner surstylus: (a) smooth; (b) with two short setulae on each sustylus. State b is not observed within the outgroup Tephritidae.

Table 1. Distribution of character state used in cladistic analysis
a = plesiomorphy; b, c = apomorphy; ? = uncertain states.

Species	Characters																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Hypothetical ancestor	a	a	a	a	a	?	a	a	?	?	a	a	a	a	a	a	?	a	a	?	a
Adapsilia breviantenna nsp	a	a	a	a	a	a	b	a	a	a	a	a	a	a	a	b	a	b	b	b	a
A. coarctata	a	a	b	a	a	a	b	a	a	b	a	b	b	a	a	b	b	b	b	a	b
A. cornugaster nsp	a	b	a	a	a	a	b	a	a	b	b	?	b	a	a	b	b	a	b	a	b
A. hispida nsp	a	a	b	b	a	a	a	c	a	a	a	a	?	a	a	b	a	?	b	a	b
A. longicaudata nsp	a	a	a	a	a	a	b	a	a	a	b	a	?	a	a	b	a	?	b	a	b
A. longifasciata nsp	a	b	a	a	a	a	b	a	a	a	b	b	b	b	a	b	a	b	b	a	a
A. ochrosoma nsp	a	b	b	a	a	a	b	a	a	a	a	b	?	a	a	b	b	?	b	a	b
A. tenebrosa nsp	?	?	a	a	a	a	b	a	a	a	b	a	a	?	?	a	a	a	b	b	b
Eupyrgota luteola	b	b	a	a	b	b	b	c	b	b	a	b	a	a	b	b	b	a	b	b	a
E. rufosetosa	b	a	a	a	b	b	b	c	b	b	b	b	a	a	b	b	b	a	b	b	b
E. tigrina	b	b	b	a	b	b	b	b	b	b	b	b	a	b	a	b	b	a	a	b	b
Paradapsilia trinotata	a	a	a	a	a	a	b	b	b	a	a	b	a	a	a	b	a	a	a	a	?
Parageloemyia nigrofasciata	a	b	a	b	a	a	a	a	a	a	b	a	a	a	a	a	b	a	a	a	c
P. wonjuensis nsp	a	a	a	b	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	a	c

Character 19*. Median carina on face: (a) not apparent; (b) strong, sharply divide antennal foveae. State a is much more common within the outgroup Tephritidae.

Character 20. Arista: (a) clearly with microscopic pubescence; (b) apparently without microscopic pubescence. This character is highly variably within the outgroup Tephritdae.

Character 21*. Dorsocentral setae: (a) 1 pair; (b) 2 pairs; (c) 3 pairs. State a is most commonly found in the outgroup Tephritidae.

To infer pylogenetic relationships among 14 Korean pyrgotid species, we conducted a cladistic analysis using PAUP software (Swofford, 2001). Except for Character 21, all the character states were considered unordered and equally likely for both forward and backward changes. Character 21 was considered as ordered because its character transformation direction seemed clear. A branch-and-bound search recovered a single most parsimonious tree (Fig. 1A, length = 49). However, there are 345 next parsimonious trees (length = 50), and the 50% majority rule consensus tree of the most and next parsimonious trees shows rather poor resolution in their phylogenetic relationships (Fig. 1B). Only two clades, *Eupyrgota* and *Parageloemyia*, are supported 100% by all 346 trees. This might indicate homoplastic nature of the character set we used. We, therefore, reweighted the characters based on maximum value of rescaled consistency indices. Successive weighting recovered two most parsimonious trees, whose consensus tree is shown in Fig. 1C. The ACCTRAN character state optimization option was used to hypothesize character state changes.

As expected, monophyly of *Adapsilia* was not supported. This genus is currently defined as a heterogeneous assemblage of species that lacks derived characters of other genera in the family Pyrgotidae. Therefore, it seems natural to have *Adapsilia* species spreaded all over the phylogenetic tree of Pyrgotidae. On the other hand, monophyly of three Korean *Eupyrgota* is clearly supported based on

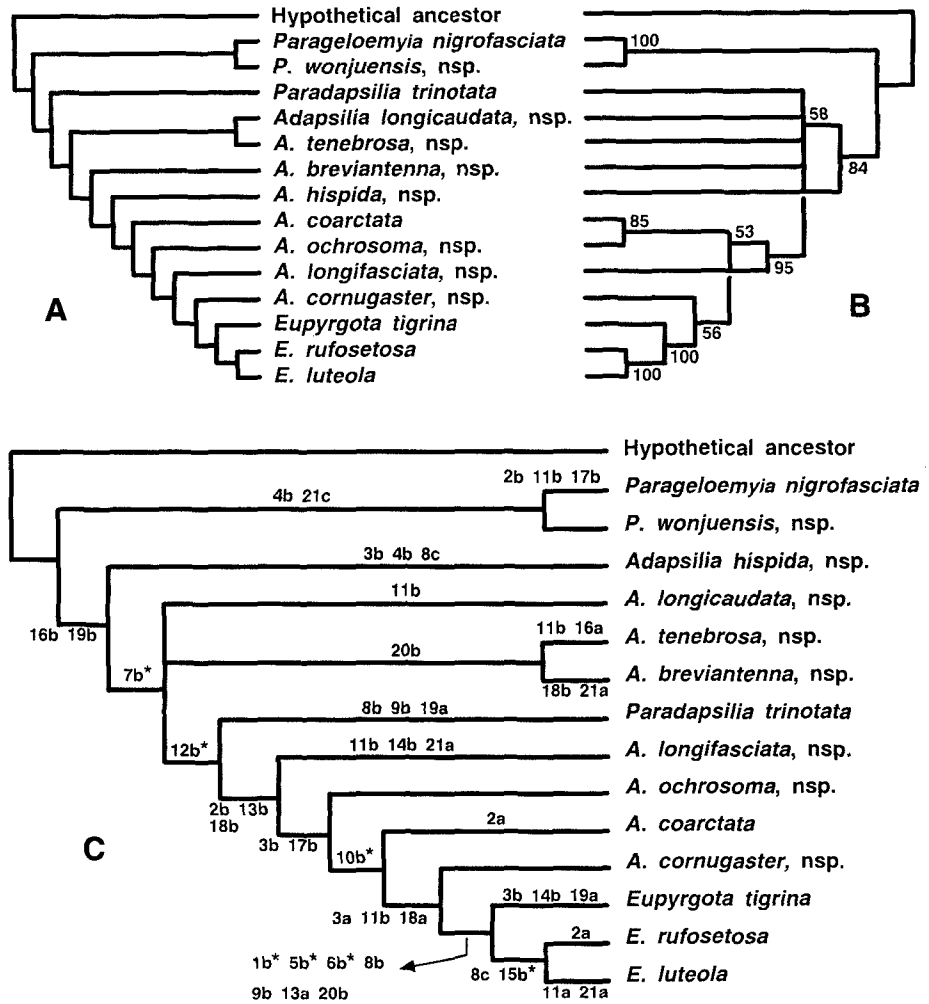


Fig. 1. Cladograms of the Korean Pyrgotidae. (A) Single most parsimonious (MP) tree based on the equally weighted characters. Statistics: tree length = 49; consistency index = 0.4694; homoplasy index = 0.5306; retention index = 0.6176; rescaled consistency index = 0.2899. (B) 50% majority rule consensus tree of the 346 most and next parsimonious trees based on the equally weighted characters. (C) Strict consensus tree based on the two MP trees recovered after successive weighting. Characters were reweighted by maximum value of rescaled consistency indices. Numbers and letters refer to selected characters and character states representing apomorphic changes. Asterisks (*) indicate the seven characters having maximum weight after successive weighting.

seven synapomorphies, among which Characters 1b, 5b, and 6b define this genus only and, thus, can be served as good generic diagnostic characters (apicoventral hooks on oviscape, row of short and strong ventral spines on apical half of femora, and relatively long first flagellomere). Within the genus *Eupyrgota*, a sistergroup relationship of *E. luteola* and *E. rufosetosa* is clearly supported by sharing the T-shaped spermatheca. Closer relationship of *Eupyrgota* and two *Adapsilia* species (*A. coarctata* and *A. cornugaster*) are indicated by the presence of dark genal streak. However, presence of a certain color

pattern seems to be highly subject to homoplasy as observed in other tephritoid taxa (Han, 2000). Possible existence of a large monophyletic group including *Paradapsilia*, some *Adapsilia* species, and *Eupyrgota* is also indicated by the spurious vein on R_{2+3} (Char. 12b). However, this hypothesis needs to be tested by other source of data because such a spurious vein occasionally occurs in a few tephritid taxa such as *Paratrypeta* and *Toxotrypana* (Han, 2000; Norrbom *et al.*, 2000).

Parageloemyia and *Geloemyia* together are currently separated from any other pyrgotid genera by the presence of macrotrichiae on R_{4+5}. *Parageloemyia* is then distingished from *Geloemyia* by having the two pairs of scutellar setae and three pairs of dorsocentral setae. *P. wonjuensis*, sp. nov., does not have macrotrichiae on R_{4+5} but possesses the latter two character states. Our inferred phylogenetic tree seems to justify the inclusion of this species in the genus *Parageloemyia*. Presence of macrotrichiae on R_{4+5} may be a good diagonstic character for *Geloemyia* and most *Parageloemyia*, but it appears to be plesiomorphic because it is most commonly found in the family Tephritidae, which is the sistergroup of Pyrgotidae. It might have independently lost in *P. wonjuensis* and other pyrgotid genera. The basal position of *Paragelomyia* seems also support this speculation.

The midfemoral bare area in female (Character 2b - e.g., Figs 6G, 10G, 12G, 14G) is a unique state not found in any other tephritoid families. However, it does not support any discrete group among the taxa analysed. It rather shows confusing pattern of homoplasies. This character state might have evolved early in the pyrgotid evolution and lost many times subsequently, or, alternatively, it independently derived a number of times in association with their peculiar ovipositing behavior on rather slippery hosts, scarabaeoid beetles.

Key to the Korean Species of the Family Pyrgotidae

1. Ocellar seta reduced; arista apparently 3-segmented (i.e., basal aristal segment clearly visible) (Fig. 7E of Kim and Han, 2000) ..... *Paradapsilia trinotata* Chen
   Ocellar seta distinct; arista apparently 2-segmented (i.e., basal aristal segment indistinct) 2
2. Apical half of each femur with a row of relatively short and strong ventral spines; oviscape with a pair of apicoventral hooks (Figs 2A, 4A, 6B of Kim and Han, 2000) 3
   Femur without such spines; ovicape without apicoventral hooks 5
3. Single pair of scutellar setae; spermathecae normal shaped (Fig. 5A of Kim and Han, 2000) ..... *Eupyrgota tigrina* Kim et Han
   Two or more pairs of scutellar setae; one of the spermathecae T-shaped (Figs 2E, 4E of Kim and Han, 2000) 4
4. Setae and setulae reddish yellow to reddish brown; female midfemur without bare area (Fig. 3G of Kim and Han, 2000) ..... *Eupyrgota rufosetosa* Chen
   Setae and setulae black; female midfemur with a large bare area on anterior apical half (Fig. 1G of Kim and Han, 2000) ..... *Eupyrgota luteola* Coquillett
5. Three pairs of dorsocentral setae well developed in both sexes; scutellum smooth without apparent setulae 6
   One or two pairs of dorsocentral setae; if three pairs, anterior pair poorly developed; scutellum covered with setulae 7

6. Vein R_{4+5} with macrotrichiae (Fig. 14G); wing hyaline with brown bands ..... *Parageloemyia nigrofasciata* (Hendel)
   Vein R_{4+5} without macrotrichiae (Fig. 16G); wing brown with hyaline spots ..... *Parageloemyia wonjuensis* Kim et Han, sp. nov.
7. Arista with microscopic pubescence 8
   Arista apprently bare 13
8. Gena with brown to dark brown genal streak 9
   Gena without such genal streak 10
9. Pedicel shorter than first flagellomere in dorsal view; oviscape with apicodorsal projection (Fig. 6G) ..... *Adapsilia cornugaster* Kim et Han, sp. nov.
   Pedicel at least twice as long as first flagellomere in dorsal view (Fig. 4E); oviscape without such apicodorsal projection ..... *Adapsilia* coarctata Waga
10. R_{2+3} with spurious vein (Figs 10G, 12G) 11
    R_{2+3} without spurious vein 12
11. Two pairs of orbital setae; sternites 2 and 3 with short lateral setulae in male (Fig. 10D); midfemur without bare area in female ..... *Adapsilia longifasciata* Kim et Han, sp. nov.
    Sing pair of orbital setae; male sternites without such lateral setulae; midfemur with bare area in female (Fig. 12G) ..... *Adapsilia ochrosoma* Kim et Han, sp. nov.
12. Single pair of acrostichal setae present; two pairs of dorsocentral setae (Fig. 8A) ..... *Adapsilia hispida* Kim et Han, sp. nov.
    Acrostichal seta absent; single pair of dorsocentral setae (Fig. 9A) ..... *Adapsilia longicaudata* Kim et Han, sp. nov.
13. Genal depth less than half as long as longest diameter of eye (Fig. 2G); arista gradually tapered toward apex (Fig. 2E) ..... *Adapsilia breviantenna* Kim et Han, sp. nov.
    Genal depth slightly shorter than longest diameter of eye (Fig. 13E); basal 1/4 of arista thickened and rest very slender (Fig. 13D) ..... *Adapsilia tenebrosa* Kim et Han, sp. nov.

Genus *Adapsilia* Waga, 1842

Adapsilia Waga 1842: 279. Type-species: *Adapsilia coarctata* Waga, by original designation.

Diagnosis. Small to medium sized flies with variable chaetotaxy and wing patterns. This genus is not very well defined, but can be distinguished by the following combination of characteristics; 1) wing hyaline with brownish patterns; 2) all femora without ventral spine-like setal row; and 3) oviscape without ventral hook.

Adapsilia breviantenna Kim et Han, sp. nov. 짧은뿔풍뎅이파리

(Figs 2A-G, 3A-G)

Diagnosis. This species is similar to *A. longifasciata*, sp. nov., but can be distinguished from the latter by the following combination of characteristics: 1) antenna with arista bare, 2) midfemur without bare

area in female, and 3) sternite 2-3 without dense lateral setulae in male.

Description. Body brownish yellow ground color with brown to dark brown pattern; all setae and setulae dark brown, except for yellowish red setulae on tibiae and tarsi; mesonotum length 3.1-3.5mm, wing length 9.2-9.9 mm. Head (Fig. 2F) brownish yellow to reddish yellow with brown to dark brown pattern; frontal-head ratio 0.37-0.43; *eye* ratio 0.59-0.67; genal-*eye* ratio 0.30-0.44; first flagellomere-pedicel ratio 1.14 in male, 0.60-0.70 in female; aristal-antennal ratio 1.38-1.58; medial vertical seta 0.54-0.69x as long as longest diameter of *eye*; lateral vertical seta 0.30-0.53x as long as medial vertical seta; postocellar seta 0.30-0.45x as long as medial vertical seta; paravertical seta reduced; ocellar seta 0.38-0.48x as long as medial vertical seta, with 2-6 short setulae; 2 orbital seta; frons brownish yellow to yellowish red with brown pattern; frontal vitta indistinct with sparse short setulae; antenna (Fig. 2E) brownish yellow; first flagellomere with yellowish brown pruinosity, transversely elliptic in outline; arista bare; face reddish yellow; antennal foveae moderately concave with gently raised median carina; median carina 0.86-0.91x as long as face; gena with genal seta well developed; palpi brownish yellow, short and broad. Thorax (Fig. 2A) brownish yellow ground color with brown patterns; postpronotal lobe brownish yellow with 1 postpronotal seta and 8-11 setulae; scutum brownish yellow to yellowish brown with 1 presutural supra-alar seta, 1-2 dorsocentral setae; AS brown, merged with SSS, ending slightly before level of dorsocentral setae; AD brown; DS brown, ending at level of postsutural supra-alar setae; scutellum yellowish brown, largely covered with short setulae; apical scutellar seta 1.47-2.07x as long as scutellum; basal scutellar seta 1.43-1.71x as long as scutellum; pleura (Fig. 2G) brownish yellow with yellowish brown to brown patterns; proepisternum yellowish brown to brown with 2-6 setulae, proepisternal seta absent; anepisternum yellowish brown to brown, anteriorly covered with short setulae, posteriorly with single anepisternal seta and longitudinally arranged setal row; katepisternum yellowish brown with single katepisternal seta and both longitudinally and transversely arranged short setulae, ventrally with dense long and stout setulae; anepimeron yellowish brown, anteriorly with 1 anepisternal seta and 1 setulae. Legs brownish yellow; all femora ventrally with long and slender setal row, basal-most seta exceptionally long; midtibial spur 0.54-0.8x as long as apical tibial width; hind femur with 4-7 long apicodorsal setae; tarsus with tarsomere 5 darker than others in male. Wing hyaline with brown patterns (Fig. 2G; broader with darker pattern in male); wing-thorax ratio 2.63-3.09, vein R_{4+5} ratio 0.51-0.58, vein M ratio 0.40-0.50; humeral and subcostal break present; Sc incomplete to C; vein R_{4+5} nearly straight; cell bm, bcu entirely covered with microtrichiae.

Male abdomen (Figs 2C, D) yellowish brown with dark brown patterns, medially with yellowish brown; syntergite 1+2 1.48x as long as tergites 3-4 combined; 5th tergite 0.77x as long as syntergite 1+2, shiny dark brown; genitalia (Figs 3A-E) with epandrium dark brown; hypandrium reddish brown to dark brown; cerci yellowish brown with short setulae, relatively large, completely fused; surstylus more or less protruding, medial surstylus with 2 short yellowish brown setulae.

Female abdomen (Figs 2A, B) yellowish brown to brown with dense setulae; syntergite 1+2 1.42-2.06x as long as tergites 3-6 combined; oviscape (Fig. 2B) yellowish brown to brown with short setulae, basally with shiny brown, bare; 1.38-1.63x as long as preabdominal tergites combined; aculeus (Fig. 3F) brown to dark brown; 3 spermathecae (Fig. 3G) dark brown, smooth.

Type Specimens. Holotype ♀ [YSUW], GYEONGSANGBUK-DO, Andong-si, Okjeong-dong,

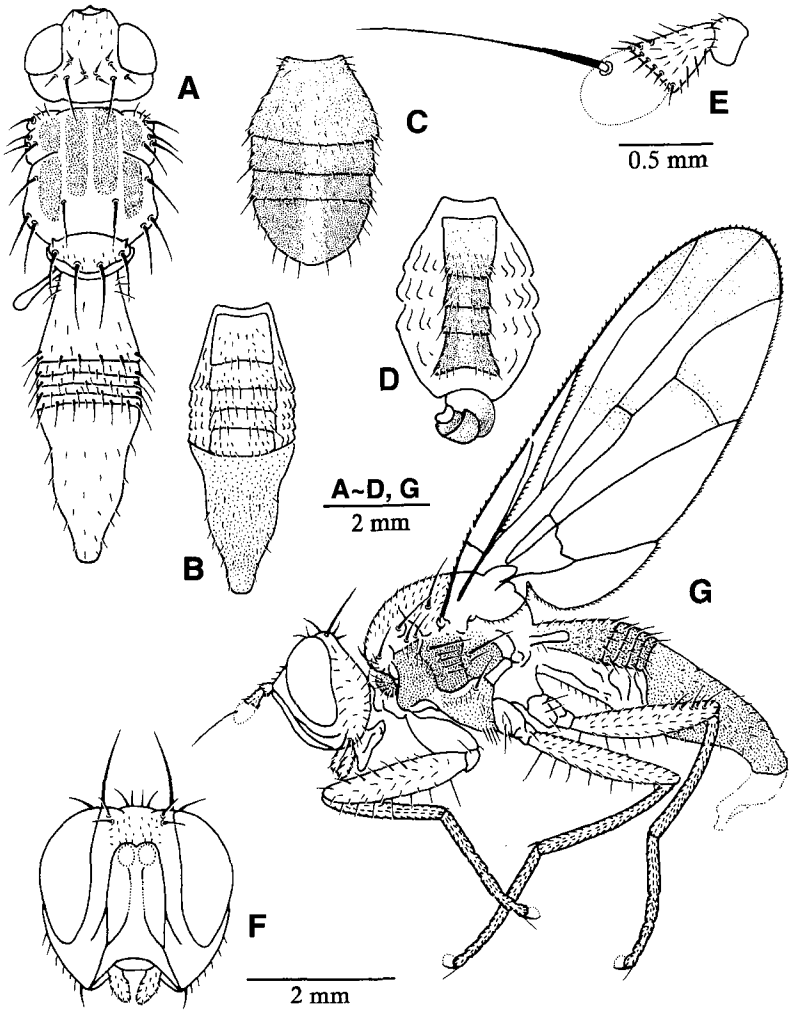


Fig. 2. *Adapsilia breviantenna* Kim et Han, sp. nov.: (A) body, dorsal view, ♀; (B) abdomen, ventral view, ♀; (C) abdomen, dorsal view, ♂; (D) abdomen, ventral view, ♂; (E) antenna, lateral view, ♀; (F) head, anterior view, ♀; (G) body, lateral view, ♀.

Andongdam, black light trap, 9 V 1997 (M.-R. Lee). The abdomen of holotype was dissected and kept in a genitalia vial. Paratypes: GANGWON-DO: [YSUW] 1♀, Wonju-si, Heungeob-myeon, Maeji-ri, Yonsei Univ. Campus, 3 V 1998 (H.-W. Byun); 1♀, ditto, black and mercury vapor light trap, 11 V 1999 (S.-K. Kim & C.-H. Park). GYEONGGI-DO: [KUS] 1♀, Gapyeong-gun, 10 V 1977 (H.-Y. Moon); [SSUK] 1♀, Namyangju-si, Sudong-myeon, Maseok, 18 V 1984 (S.-Y. Yang); [KUS] 1♀, Paju-si, Gwangtan-myeon, Mt. Gyemyeongsan, Aengmubong, 16 V 1976 (J.-W. Lee). GYEONGSANGNAM-DO: [KSUJ] 1♀, Jinju-si, Gagok-dong, 22 V 1989.

Etymology. The specific name is derived from the Latin "brevis" and "antenna", referring their relatively short antennae.

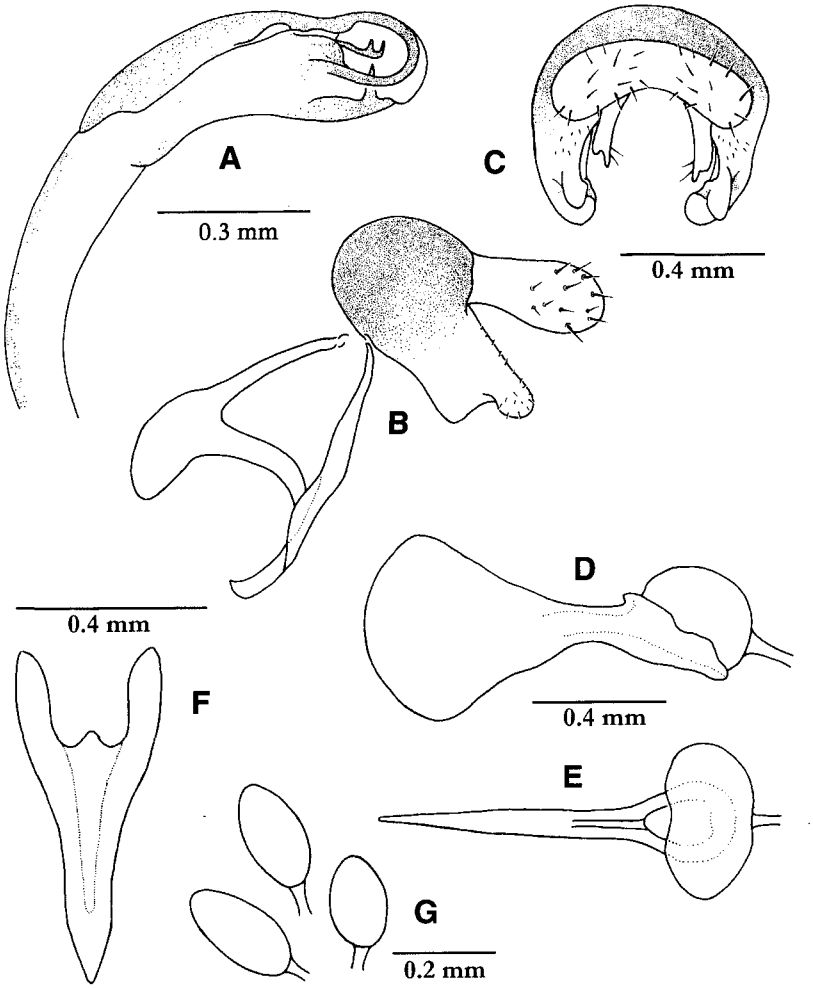


Fig. 3. *Adapsilia breviantenna* Kim et Han, sp. nov.: (A) glans, lateral view; (B) epandrial complex, lateral view; (C) epandrial complex, posterior view; (D) ejaculatory apodeme, lateral view; (E) ejaculatory apodeme, dorsal view; (F) aculeus, dorsal view; (G) spermathecae.

Distribution. Korea.

***Adapsilia coarctata* Waga** 긴뿔퐁뎅이파리

(Figs 4A-G, 5A-H, 18)

Adapsilia coarctata Waga 1842: 279 (type data unknown): Rondani 1871: 46; Loew 1873: 12; Handlirsch 1886: 34; Mik 1886: 277; Hendel 1908: 14; Hendel 1914: 79; Hendel 1934: 147; Enderlein 1942: 106; Chen 1947: 69; Aczél 1958: 39; Stackelberg 1970: 121; Soós 1984: 36; Merz 1996: 406; Shi 1996: 587.

Adapsilia (Adapsilia) coarctata: Hendel 1933: 8.

Pyrgota coarctata: Schiner 1864: 67.

Diagnosis. This species can be readily distinguished from other Korean pyrgotid species by the following combination of characteristics; 1) pedicel at least twice as long as first flagellomere in dorsal view (Fig. 4E); 2) midtarsus with conspicuous short stout ventral setal row in male.

Description. Body reddish yellow to brownish yellow with dense setulae; setae and setulae black, except for yellowish red ventral setulae on tibiae and tarsi; mesonotum length 2.8–2.95 mm; wing length 8.5–9.5 mm. Head (Fig. 4F) reddish yellow to brownish yellow; frontal-head ratio 0.36; eye ratio 0.60–0.64; genal-eye ratio 0.60 in male; 0.37–0.43 in female; first flagellomere-pedicel ratio 0.42–0.44 in dorsal view; aristal-antennal ratio 0.72–0.94; medial vertical seta 0.58–0.68x as long as longest diameter of eye; outer vertical seta 0.32–0.37x as long as medial vertical seta in female, slightly shorter in male; postocellar seta usually lacking in both sexes, when present as long as outer vertical seta in female; paravertical seta reduced, short hair-like; ocellar seta reduced in male, 0.32–0.43x as long as medial vertical seta in female; 1 orbital seta; frons pale yellow to reddish yellow; antenna (Fig. 4E) reddish yellow to yellowish brown; pedicel apico-dorsally with 2 stout setae, 3–4 ventrally; first flagellomere with reddish yellow pruinosity; apex round; arista reddish brown with microscopic pubescence; face pale yellow to reddish yellow; antennal foveae moderately concave with median carina, 0.85–0.9x as long as facial length; gena yellow to yellowish brown with dark brown transverse streak from lower eye margin toward oral margin, 0.58–0.6x as long as genal depth; genal seta 0.37–0.43x as long as medial vertical seta; postgena pale yellow with postgenal seta 0.24–0.29x as long as medial vertical seta. Thorax (Fig. 4A) reddish yellow ground color with short dense setulae; postpronotal lobe pale yellow to yellow with 1 postpronotal seta (lacking in some male specimens) and short setulae; scutum with standard chaetotaxy, plus 2 scapular setae; thoracic stripe indistinct; scutellum reddish yellow with sparse short setulae; apical scutellar seta 1.85x as long as scutellum in male, 2.15x in female; basal scutellar seta 1.38–1.77x as long as scutellum; pleura (Fig. 4G) pale yellow to reddish yellow; proepisternum yellow with relatively long setulae; anepisternum reddish yellow with 1 anepisternal seta and long setulae; katepisternum pale yellow to reddish yellow with 1 katepisternal seta and moderately long setulae, ventrally with 3 relatively long setulae; anepimeron pale yellow to yellow with 1 anepimeral seta and 2–3 fairly long setulae. Legs yellowish brown ground color; all three femora basally with 1 long and slender ventral seta; fore femur with erect setulae, apically with relatively long and slender ventral setal row, dorsally with 4 stout setae; midtibial spur 0.82–0.9x as long as apical tibial width; midtarsus with tarsomere 1–2 ventrally with 2 short stout setal row in male; hind femur dorsally with 5 stout setae. Wing hyaline with brownish patterns (Figs 4G, 18; broader and darker in male); wing-thorax ratio 3.04–3.22, vein R_{4+5} ratio 0.41–0.46, vein M ratio 0.52–0.63; humeral, subcostal break present; Sc complete to C; R_{2+3} subapically with short posteriorly directed spurious vein; cell bcu, bm entirely covered with microtrichiae.

Male abdomen (Figs 4C, D) yellowish brown ground color with dense setulae, laterally with moderately long setulae; syntergite 1+2 1.74–1.78x as long as tergites 3–4 combined; tergite 5 with 0.66–0.68x as long as syntergite 1+2; posterior half of sternite 2 and entire sternite 3 laterally with conspicuous black setae; genitalia (Figs 5D–H) with epandrium yellowish brown; hypandrium brown; aedeagal apodeme brown; ejaculatory apodeme pale brown, fan-shaped; paired cerci brownish yellow with long setulae; surstylus short, yellowish brown, medial surstylus reddish brown with 2 pairs dark brown setae.

Female abdomen (Figs 4A, B) yellowish brown ground color, laterally with moderately long setulae;

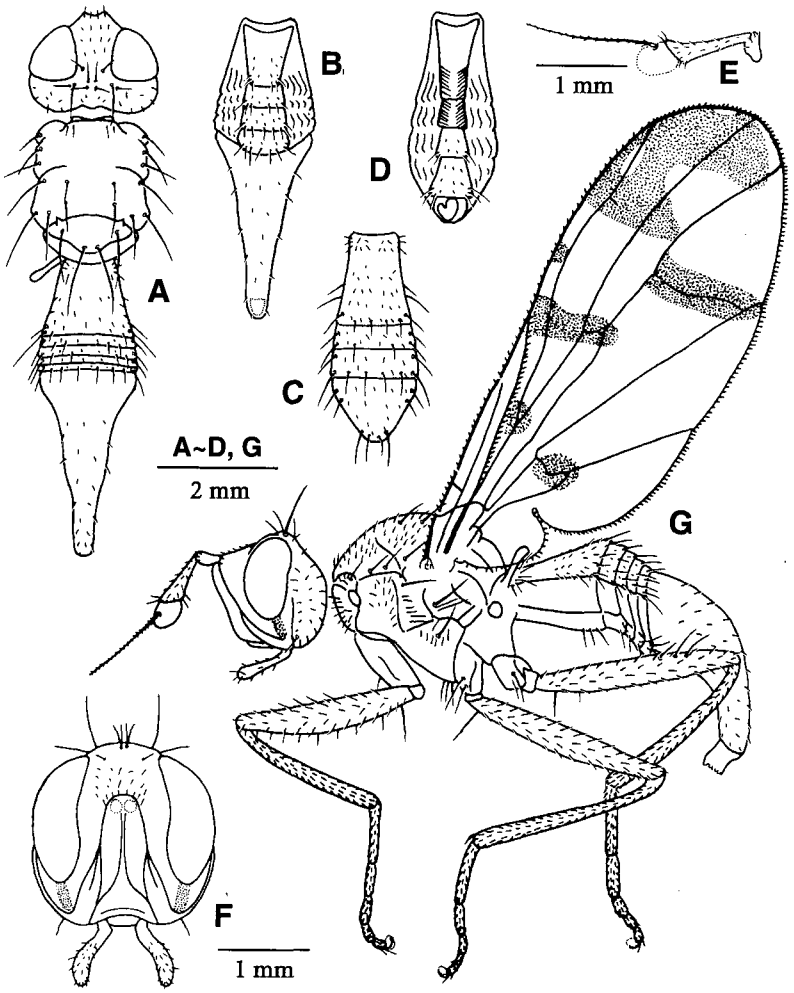


Fig. 4. *Adapsilia coarctata* Waga: (A) body, dorsal view, ♀; (B) abdomen, ventral view, ♀; (C) abdomen, dorsal view, ♂; (D) abdomen, ventral view, ♂; (E) antenna, lateral view, ♀; (F) head, anterior view; (G) body, lateral view, ♀.

syntergite 1+2 2.0-2.37x as long as tergites 3-6 combined; tergite 6 very short; oviscape (Fig. 5A) brownish yellow with 1.43-1.56x as long as preabdominal tergites combined; aculeus (Fig. 5B) dark brown, sharply pointed; 3 spermathecae (Fig. 5C) yellowish brown, smooth.

Specimens examined. GANGWON-DO: [YSUW] 1♀, Wonju-si, Heungeob-myeon, Maeji-ri, Hoechon, 7 IX 1997 (H.-Y. Han & K.-E. Ro); 1♂, Hongcheon-gun, Nae-myeon, Mt. Gyebangsan 1577 m peak from Unduryeong, 3 IX 2000 (S.-K. Kim *et al.*); 2♂, Jeongseon-gun, Nam-myeon, Mureung-ri, Mt. Mindungsan, 30 VIII 2000 (H.-Y. Han *et al.*); 1♂, 1♀, ditto, 29 VIII 2001 (H.-Y. Han & K.-E. Ro). GYEONGGI-DO: [UIB] 1♀, Namyangju-si, Sudong-myeon, Mt. Cheonmasan, 29 VIII 1995; [NIAS] 1♂, Pocheon-gun, Yeongbuk-myeon, Sanjeong-ri, Lake Sanjeonghosu, 25 VIII 1984 (S.-B. Ahn).

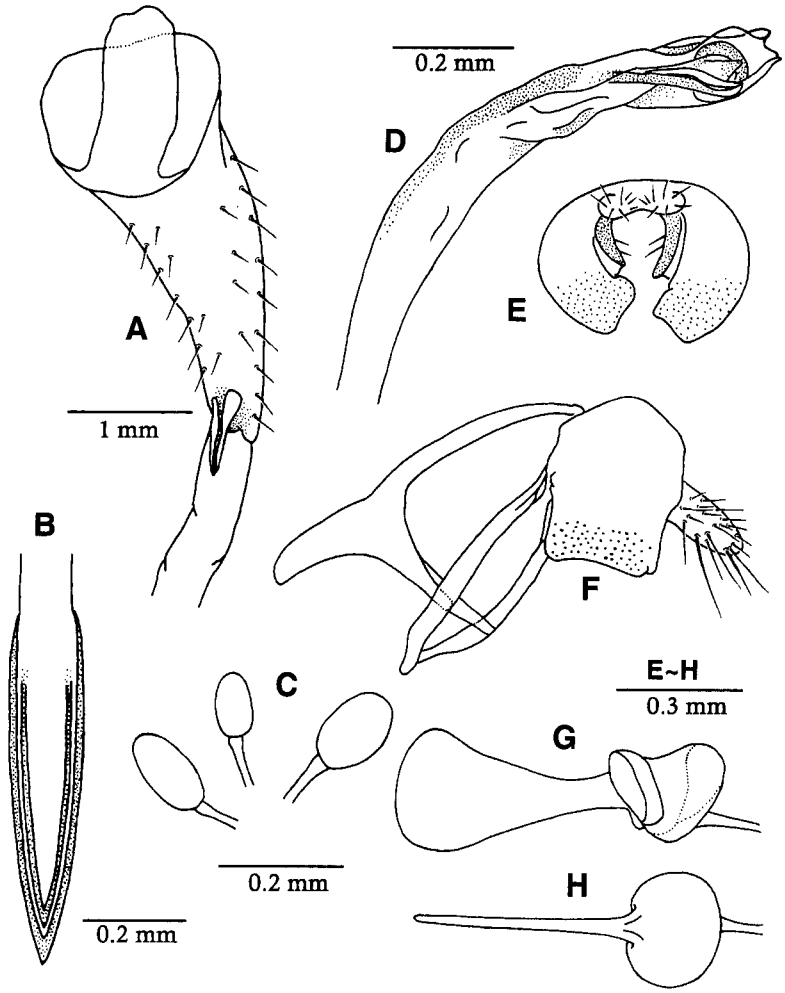


Fig. 5. *Adapsilia coarctata* Waga: (A) oviscape, lateroventral view; (B) aculeus, dorsal view; (C) spermathecae; (D) glans, lateral view; (E) epandrial complex, posterior view; (F) epandrial complex, lateral view; (G) ejaculatory apodeme, lateral view; (H) ejaculatory apodeme, dorsal view.

Distribution. Korea, Japan, China, Mongolia, Central and Eastern Europe.

***Adapsilia cornugaster* Kim et Han, sp. nov.** 엉덩뿔풍뎅이파리

(Figs 6A-G, 7A-H, 19, 20)

Diagnosis. This species can be readily distinguished from any other Korean pyrgotid species by the oviscape with an apicodorsal projection (Fig. 6G). It closely matches the original and subsequent descriptions of some Oriental and Palaearctic species including *A. verrucifer, A. megophthalma*, and *A. scutellaris*. But *A. cornugaster* may be distinguished from these species by the combination of the following characteristics: 1) presence of bare area on midfemur in female, 2) scutellum mesally with

brown pattern, and 3) apex of vein R_{2+3} bent upward.

Description. Pale yellow ground color with brown to dark brown patterns; setae and setulae black, except for yellowish red ventral setulae on tibiae and tarsi; mesonotum length 1.55-2.45 mm, wing length 5.0-6.3 mm. Head (Fig. 6E) pale yellow to yellowish brown ground color with brown patterns; frontal-head ratio 0.29-0.37, eye ratio 0.65-0.72, genal-eye ratio 0.32-0.50; first flagellomere-pedicel ratio 0.55-0.78 in male, 0.70-0.89 in female, in dorsal view, aristal-antennal ratio 0.85-1.15; medial vertical seta 0.62-0.78x as long as longest diameter of eye; outer vertical seta 0.17-0.29x as long as medial vertical seta; paravertical seta reduced, slightly longer than nearby setulae; ocellar seta 0.24-0.39x as long as medial vertical seta; postocellar seta 0.22-0.39x as long as medial vertical seta; 1 orbital seta; frons pale yellow to reddish yellow with sparse fine setulae; antenna (Fig. 6F) reddish brown; first flagellomere reddish brown, rounded apically; arista dark brown with microscopic pubescence; face reddish brown ground color; antennal foveae deeply concave with sharply raised median carina; median carina dark brown to black, 0.88-0.92x as long as facial length; gena with brownish black streak from lower eye margin toward half way to oral margin. Thorax (Fig. 6A) pale yellow ground color with dark brown patterns; postpronotal lobe pale yellow with 1 postpronotal seta and short setulae in female, seta absent in male; scutum with presutural supra-alar seta present (6 out of 10) in female, almost absent in male; dorsocentral seta 2 pairs in female, but mostly 1 pair in male (if 2 pairs anterior one poorly developed); 1 scapular seta; AS brown, merged with SSS; SSS brown, ending at level of scutoscutellar suture, sometimes connected with scutellar pattern; AD brown, usually merged with SSS; DS brown, combined with SSS at level of dorsocentral seta; scutellum pale yellow with sparse short setulae, medially with brown pattern; apical scutellar seta 1.9-2.29x as long as scutellum in male, 2.08-2.75x in female; basal scutellar seta 1.2-1.8x as long as scutellum; pleura (Fig. 6G) pale yellow with brown patterns; proepisternum largely brown with 5-6 moderately long setuale in male, 1 proepisternal seta and relatively long setule in female; anepisternum pale yellow with largely occupied by brown antero-medial transverse pattern, 1 anepisternal setae and short setulae; katepisternum pale yellow with yellowish brown to reddish brown pattern, ventrally with relatively long setulae; 1 katepisternal seta and 1-2 setulae; anepimeron pale yellow with anterior half reddish brown, 1 anepimeral seta and 1-2 setulae. Leg reddish brown ground color; all three femora basally with 1 long and slender ventral seta plus moderate sized setal row; fore femur covered with erect setulae; female midfemur anteromedially with oval and slightly concave bare area; midtibial spur 0.81-0.93x as long as apical tibial width; hind femur dark brown with short setulae, 4 conspicuous stout apicodorsal setae. Wing hyaline with brown patterns (Figs 6G, 19, 20; darker in males); wing-thorax ratio 2.49-3.25, vein R_{4+5} ratio 0.39-0.48, vein M ratio 0.5-0.7 in male, 0.47-0.54 in female; humeral, subcostal break present; Sc incomplete to C; R_{2+3} subapically with short spurious vein, largely absent in both sexes (7 of 26 males, 16 of 26 females); cell bcu and bm entirely covered with microtrichiae.

Male abdomen (Figs 6C, D) dark brown to black with short setulae, apically with conspicuous long setae on each tergite; syntergite 1+2 1.14-1.5x as long as tergites 3-4 combined; tergite 5 shiny black, slightly longer than tergite 3-4 combined; posterior half of sternite 2 and entire sternite 3 laterally with dense black setae; genitalia (Figs 7D-H) with epandrium shiny black; paired cerci yellowish brown with 3-5 long setulae; surstylus short, reddish brown.

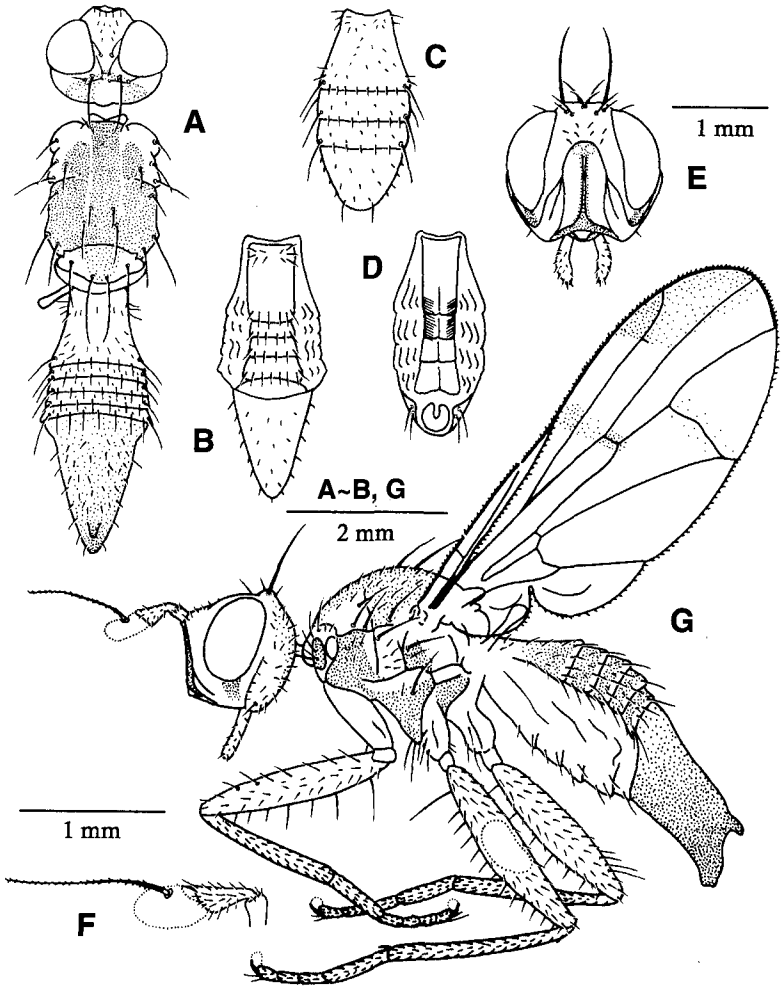


Fig. 6. *Adapsilia cornugaster* Kim et Han, sp. nov.: (A) body, dorsal view, ♀; (B) abdomen, ventral view, ♀; (C) abdomen, dorsal view, ♂; (D) abdomen, ventral view, ♂; (E) head, anterior view, ♀; (F) antenna, lateral view, ♀; (G) body, lateral view, ♀.

Female abdomen (Figs 6A, B) reddish brown ground color with dense setulae; syntergite 1+2 1.6-2.1x as long as tergites 3-6 combined; tergite 6 very short, sometimes invisible in dorsal view; oviscape (Fig. 7A) reddish brown ground color, basal area dorsally convex, shiny reddish brown, bare; 1-1.4x as long as preabdominal tergites combined; subapically with yellowish brown to dark brown dorsal projection; aculeus (Figs 7B) reddish brown, spatulate; 3 spermathecae (Fig. 7C) yellowish brown, smooth.

Type Specimens. Holotype ♂ [YSUW], GANGWON-DO, Wonju-si, Heungeob-myeon, Maeji-ri, Yonsei Univ. campus, collected from mercury vapor light, 12 VII 1999 (S.-K. Kim & C.-H. Park). Paratypes: GANGWON-DO: Wonju-si: [YSUW] 6♀, Gwirae-myeon, Gwirae-ri, black & mercury vapor light trap, 5 VII 1996 (H.-Y. Han & H.-W. Byun); 10♀, ditto (J.-I. Kim); 7♀, Gwirae-myeon, Wungye-ri, Baegunryung motel, black & mercury vapor light trap, 5 VII 1996 (J.-S. Park); 31♀, ditto

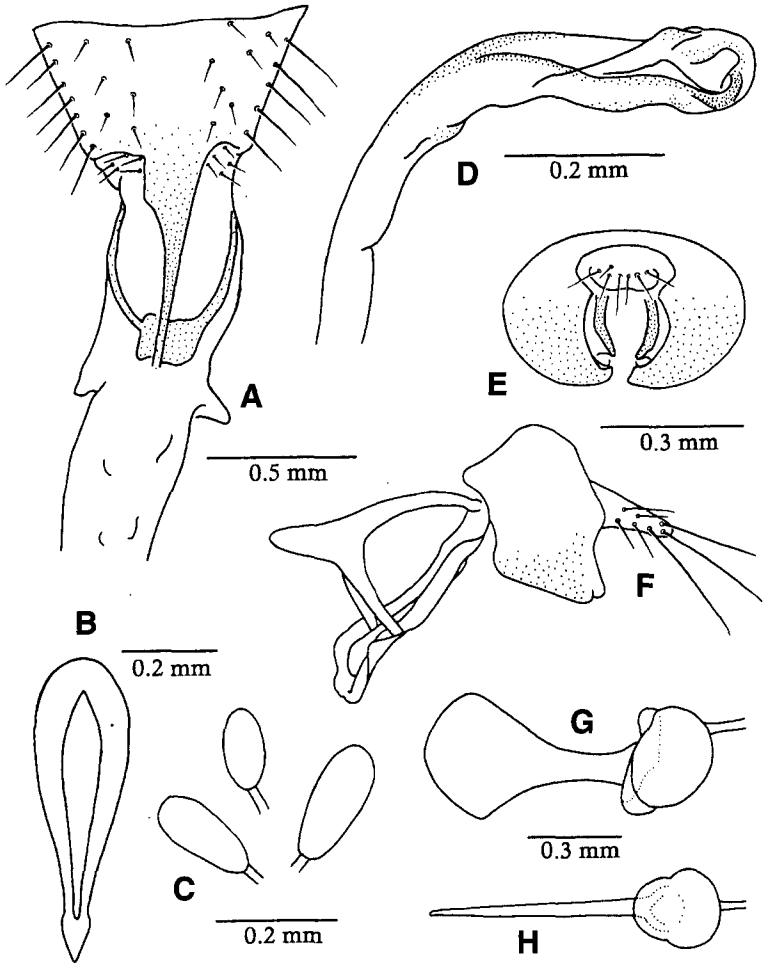


Fig. 7. *Adapsilia cornugaster* Kim et Han, sp. nov.: (A) oviscape, ventral view; (B) aculeus, dorsal view; (C) spermathecae; (D) glans, lateral view; (E) epandrial complex, posterior view; (F) epandrial complex, lateral view; (G) ejaculatory apodeme, lateral view; (H) ejaculatory apodeme, dorsal view.

(H.-Y. Han & H.-W. Byun); 2♀, ditto, 25 VI 1999 (D.-S. Choi *et al.*); 1♀, Heungeob-myeon, Maeji-ri, Yonsei Univ. campus, 2 VII 1996 (H.-W. Byun); 1♀, ditto, 23 VI 1997, (H.-Y. Han *et al.*); 1♀, ditto, 22 VI 1999 (S.-K. Kim); 2♀, ditto, 30 VI 1999 (S.-K. Kim); 3♂, 7♀, ditto, 1 VII 1999 (S.-K. Kim *et al.*); 3♂, 1♀, ditto, 3 VII 1999 (S.-K. Kim); 1♂, 5♀, ditto, 5 VII 1999 (S.-K. Kim); 4♂, 11♀, ditto, 6 VII 1999 (S.-K. Kim & D.-W. Kim); 7♂, 24♀, ditto, 7 VII 1999 (S.-K. Kim *et al.*); 1♂, 6♀, ditto, 12 VII 1999 (S.-K. Kim & C.-H. Park); 1♂, 5♀, ditto, 13 VII 1999 (S.-K. Kim); 2♀, ditto, 15 VII 1999 (S.-K. Kim); 2♂, 4♀, Panbu-myeon, Seogog-ri, Yongsugol, black & mercury vapor light trap, 17 VII 1999, (D.-S. Choi *et al.*). GYEONGSANGBUK-DO: [YSUW] 1♂, 2♀, Yeongju-si, Buseok-myeon, Mt. Seondalsan from Namdae-ri, mercury vapor light trap, 29 VI 1998 (H.-Y. Han *et al.*); 2♂, ditto, 30 VI 1998 (Y.-S. Bae & M.-K. Paek). GYEONGSANGNAM-DO: [KSUJ] 1♂, Ulju-

gun, Sangbuk-myeon, Icheon-ri, Mt. Gajisan, 1 VII 1990, (G.-O. Lee).

Etymology. The specific epithet is derived from the Latin "cornu" and Greek "gaster", meaning horned belly, referring the oviscape with horn-like dorsal process.

Distribution. Korea.

***Adapsilia hispida* Kim et Han, sp. nov.** 털보풍뎅이파리

(Figs 8A-I)

Diagnosis. This species is easily distinguished from the other Korean *Adapsilia* species by the following combination of characteristics; 1) oviscape ventrally with a projection (Fig. 8F); 2) scutellum covered with some long setulae (Fig. 8A); 3) katepisternal seta absent; and 4) relatively short wing.

Description. Body reddish brown ground color with short dense setulae; all setulae yellowish red to reddish brown; all setae reddish brown to black; mesonotum length 3.95 mm, wing length 7.6 mm. Head (Fig. 8D) reddish brown; frontal-head ratio 0.41, eye ratio 0.68, genal-eye ratio 0.19; first flagellomere-pedicel ratio 1; aristal-antennal ratio 1.31; medial vertical seta 0.45x as long as longest diameter of eye; lateral vertical seta 0.71x as long as medial vertical seta; postocellar seta 0.83x as long as medial vertical seta; paravertical seta as long as postocellar seta; ocellar seta not available (broken); 2 orbital seta; frons yellowish brown with reddish brown dense setulae; frontal vitta indistinct with reddish brown setulae; antenna (Fig. 8C) brownish yellow; first flagellomere with brownish yellow pruinosity, slightly tapering toward apex; arista with microscopic pubescence; face reddish brown; antennal foveae deeply concave with sharply raised median carina; median carina 0.74x as long as facial length; Thorax (Fig. 8A) brownish yellow to reddish brown with dark brown dense setulae; postpronotal lobe brownish yellow with 1 postpronotal seta and reddish brown dense setulae; scutum densely with short reddish brown setulae; with 1 acrostichal seta, 2 intra-alar seta, 1 presutural supra-alar seta; scapular seta indistinct from nearby setulae; AS brown, merged with SSS, ending at little beyond postsutural supra-alar seta; AD brown, connected with DS; DS brown, ending at level of anterior intra-alar seta; scutellum brownish yellow, largely covered with long setulae; apical scutellar seta 1.68x as long as scutellum; basal scutellar seta 1.74x as long as scutellum; pleura (Fig. 8E) brown to dark brown ground color with dense setulae; proepisternum reddish brown with long setulae, proepisternal seta absent; anepisternum reddish brown, largely covered with dense setulae, posteriorly with 1 anepisternal seta and longitudinally arranged setal row; katepisternum reddish brown with dense setulae, katepisternal seta absent; anepimeron brownish yellow to reddish brown, anteriorly with 1 anepisternal seta and setulae. Legs reddish brown ground color; fore coxa reddish brown with 4 long setae and long setulae; all femora basally with 1 long and slender reddish brown ventral seta; fore femur with 4 conspicuous apicodorsal setae, ventrally with long and slender setal row; midtibial spur as long as apical tibial width; midtarsus and hind tarsus with tarsomere 1 with reddish brown short stout ventral setal row; hind femur with 9 long apicodorsal setae. Wing almost entirely hyaline with wing-thorax ratio 1.92, vein R_{4+5} ratio 0.47, vein M ratio 0.59; humeral break present, subcostal break absent; Sc nearly complete to C; vein R_{4+5} nearly straight; no spurious vein on vein R_{2+3}; cell bm, bcu entirely covered with microtrichiae.

Female abdomen (Figs 8A, B) reddish brown ground color with dense setulae; syntergite 1+2 1.63x as

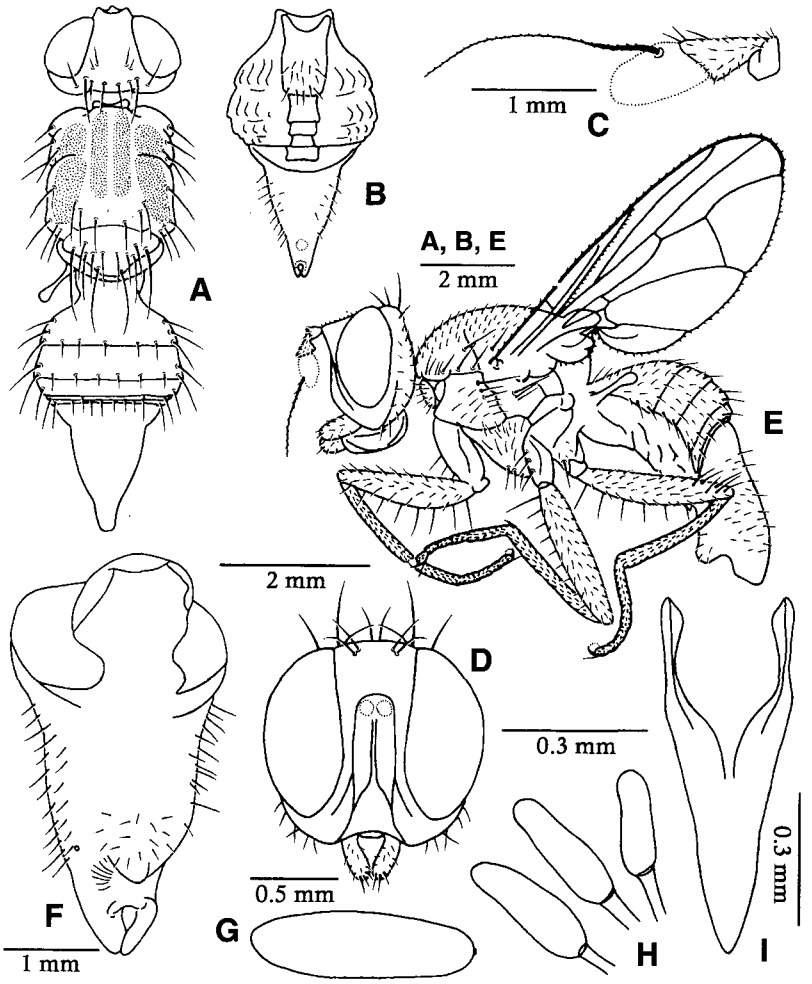


Fig. 8. *Adapsilia hispida* Kim et Han, sp. nov., ♀: (A) body, dorsal view; (B) abdomen, ventral view; (C) antenna, lateral view; (D) head, anterior view; (E) body, lateral view; (F) oviscape, ventrolateral view; (G) egg, lateral view; (H) apermatheca, lateral view; (I) aculeus, dorsal view.

long as tergites 3-6 combined; oviscape (Fig. 8F) shiny reddish brown with dense setulae, laterally with yellowish brown tinge; 1.07x as long as preabdominal tergites combined; ventrally with peculiar porjection at middle of oviscape; aculeus (Fig. 8I) brown; spermathecae (Fig. 8H) yellowish brown, smooth; egg (Fig. 8G) narrowly elliptic in outline.

Type Specimen. Holotype ♀ [YSUW], GYEONGSANGBUK-DO, Bonghwa-gun, Daehyeon-ri, black light trap, 25 VII 1986 (G.-S. Jang); abdomen dissected and kept in a genitalia vial.

Etymology. The specific epithet is derived from the Latin "hispidus" meaning bristly, referring their bristly body.

Distribution. Korea.

Remarks. The holotype is the only available specimen, on which the previous misidentification as

Eupyrgota fusca was made by Kim (1987). It was the first record of Pyrgotidae in Korea.

***Adapsilia longicaudata* Kim et Han, sp. nov.** 긴배풍뎅이파리

(Figs 9A-I)

Diagnosis. This new species can be easily distinguished from any other pyrgotid species by the following combination of characteristics: 1) oviscape extremely long (2.5x as long as preabdomen, Figs 9A, B), 2) wing with broad band and hyaline spots (Fig. 9E), and 3) median carina sharply raised (Fig. 9C).

Description. Body yellowish brown ground color with brown to dark brown patterns; all setae and setulae dark brown except for yellowish red ventral setulae on tibiae and tarsi; mesonotum length 3.75-4 mm, wing length 12.1-12.4 mm. Head (Fig. 9C) brownish yellow; frontal-head ratio 0.42-0.44, eye ratio 0.63-0.65, genal-eye ratio 0.36-0.38; first flagellomere-pedicel ratio 1.17-1.19; aristal-antennal ratio 1.26-1.28; medial vertical seta 0.50-0.51x as long as longest diameter of eye; lateral vertical seta 0.46-0.55x as long as medial vertical seta; postocellar seta 0.50-0.73x as long as medial vertical seta; paravertical seta reduced; ocellar seta 0.73-0.79x as long as medial vertical seta; 2 orbital setae; frons brownish yellow to yellowish brown with frontal vitta indistinct; antenna (Fig. 9D) yellowish brown; first flagellomere with yellowish brown pruinosity, slightly tapering toward apex; arista yellowish brown with microscopic pubescence; face yellowish brown; antennal foveae deeply concave with sharply raised median carina; median carina 0.71-0.73x as long as facial length. Thorax (Fig. 9A) yellowish brown ground color with brown to dark brown patterns; postpronotal lobe yellowish brown with 1 postpronotal seta and dense setulae; scutum with 2-3 dorsocentral setae, 1 presutural supra-alar seta; scapular seta poorly developed, indistinct from nearby setulae; AS brown, merged with SSS, ending at little before level of postsutural supra-alar seta; AD brown; DS brown, connected with AL; posterior margin of scutum brown; scutellum entirely brown with sparse setulae; apical scutellar seta 1.67-1.69x as long as scutellum; basal scutellar seta 1.50-1.73x as long as scutellum; subbasal scutellar seta 1.63-1.67x as long as scutellum; pleura (Fig. 9E) brownish yellow with brown patterns; proepisternum brown with 15-20 long setulae, proepisternal seta absent; anepisternum entirely brown, anteriorly with short sparse setulae, posteriorly with 1 anepisternal seta and longitudinally arranged setal row; katepisternum entirely yellowish brown with short setulae, but ventrally with 6-8 long setulae, katepisternal seta reduced; anepimeron entirely brown, anteriorly with 1 anepisternal seta and 15-20 long setulae. Legs brownish yellow to yellowish brown; all femora basally with 1 long and slender dark brown ventral seta; midtibial spur 0.76-0.82x as long as apical tibial width; hind femur with 6-10 long apicodorsal setae, darker than others; tarsi ventrally with short yellowish red setulae. Wing hyaline with brown patterns (Fig. 9E); wing-thorax ratio 3.03-3.25, vein R_{4+5} ratio 0.54-0.56, vein M ratio 0.65-0.71; humeral and subcostal break present; Sc incomplete to C; vein R_{4+5} slightly curved; no spurious vein on R_{2+3}; cell bm, bcu entirely covered with microtrichiae.

Female abdomen (Figs 9A, B) brown to dark brown with dense setulae; syntergite 1+2 1.4-1.64x as long as tergites 3-6 combined; oviscape (Fig. 9E) shiny brown to dark brown, sparsely covered with yellowish red setulae; 1.92-2.14x as long as preabdominal tergites combined; aculeus (Fig. 9F) reddish brown to dark brown; 3 spermathecae (Fig. 9H) dark brown, smooth; egg (Fig. 9I) narrowly elliptic in

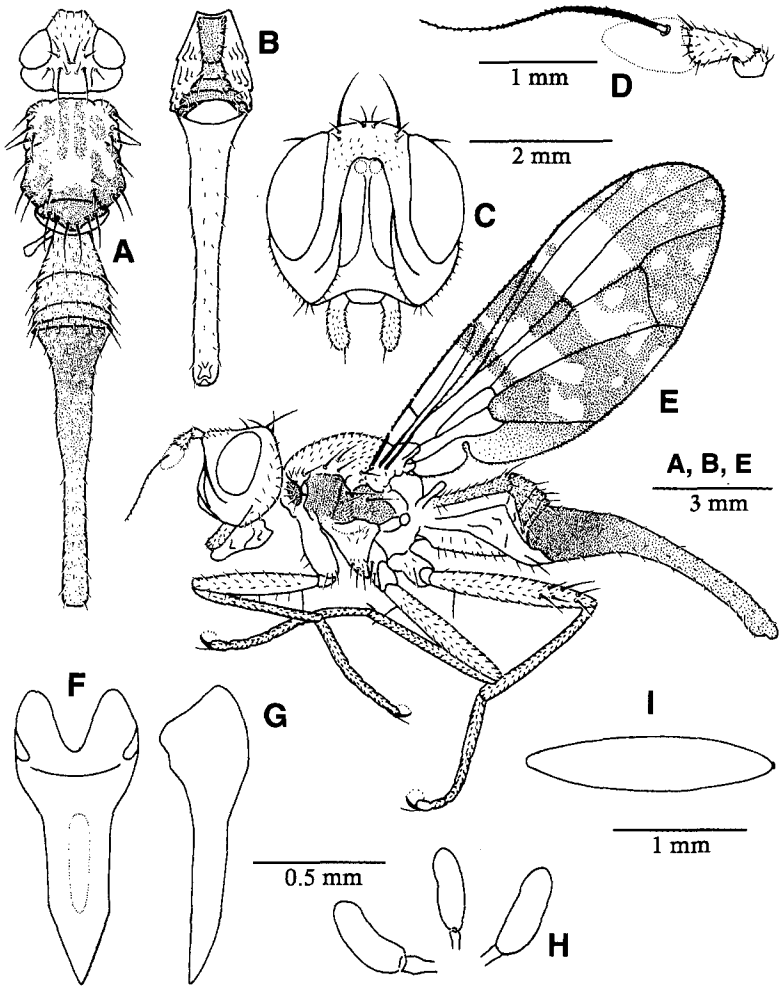


Fig. 9. *Adapsilia longicaudata* Kim et Han, sp. nov., ♀: (A) body, dorsal view; (B) abdomen, ventral view; (C) head anterior view; (D) antenna, lateral view; (E) body, lateral view; (F) aculeus, dorsal view; (G) aculeus, lateral view (H) spermathecae; (I) egg, lateral view.

outline.

Type Specimens. Holotype ♀ [YSUW], GYEONGSANGBUK-DO, Yeongju-si, Punggi-eup, Mt. Sobaeksan, Huibang Valley, 14 VII 1997 (C.-C. Chung). Paratypes: [YUK] 1♀, same data as holotype. GYEONGGI-DO: [KUS] 1♀, Pocheon-gun, Gwangneung, 8 VII 1975 (S.-I. Oh). GYEONGSANG-NAM-DO: [KSUJ] 1♀, Sancheong-gun, Sicheon-myeon, Bancheon-ri, black light trap, 7 VII 1997 (C.-W. Park).

Etymology. The specific epithet is derived from the Latin "longus" and "cauda", meaning long-tailed, referring their long oviscape.

Distribution. Korea.

Remarks. This new species might be related to *Tephritopyrgota* by sharing similar wing pattern and

sharply raised median carina. However, members of the genus *Tephritopyrogota* are mostly Afrotropical and the status of the genus is not clear. We, therefore, tentatively place the new species to the *Adapsilia*, which is currently recoginzed as a non-monophyletic genus lacking derived characters of other genera (see "Phylogenetic Relationships"). More comprehensive systematic study using worldwide taxa is needed to resolve this situation.

***Adapsilia longifasciata* Kim et Han, sp. nov.** 긴얼굴풍뎅이파리

(Figs 10A-G, 11A-H)

Diagnosis. This new species can be distinguished from other Korean pyrgotid species by the following combination of characteristics: 1) sternite 2-3 laterally with a series of short black setae in male (Fig. 10C), and 2) midfemoral bare area not concave in female.

Description. Body brownish yellow ground color with brown to dark brown pattern; all setae and setulae dark brown except for yellowish red ventral setulae on tibiae and tarsi; mesonotum length 3.25-3.4mm, wing length 8.8-9.6 mm. Head (Fig. 10E) brownish yellow; frontal-head ratio 0.29-0.33, eye ratio 0.61-0.66, genal-eye ratio 0.18-0.27; first flagellomere-pedicel ratio 0.53-0.63; aristal-antennal ratio 0.82-1.06; medial vertical seta 0.50-0.53x as long as longest diameter of eye; lateral vertical seta 0.37-0.39x as long as medial vertical seta; postocellar seta 0.40-0.53x as long as medial vertical seta; paravertical seta reduced; ocellar seta 0.37x as long as medial vertical seta in female, reduced in male; 2 orbital seta; frons brownish yellow to yellowish brown with frontal vitta indistinct; antenna (Fig. 10F) yellowish brown; first flagellomere with yellowish brown pruinosity, depressed ovate in outline; arista with microscopic pubescence; face brownish yellow; antennal foveae moderately concave with sharply raised median carina; median carina 0.9x as long as facial length. Thorax (Fig. 10A) brownish yellow ground color with brown to dark brown patterns; postpronotal lobe brownish yellow with 1 postpronotal seta and setulae; scutum with 1-2 dorsocentral setae; scapular seta well developed; AS brown, merged with SSS, narrowed at the level of dorsocentral seta, connected with scutellar pattern; AD brown, connected with DS; DS brown; posterior margin of scutum brown; scutellum brownish yellow with sparse setulae; largely brown; apical scutellar seta 1.50-1.80x as long as scutellum; basal scutellar seta 1.27-1.88x as long as scutellum; pleura (Fig. 10G) brownish yellow with yellowish brown to brown pattern; proepisternum yellowish brown with 2-5 long setulae, 3-7 short setulae, proepisternal seta absent; anepisternum yellowish brown with short setulae, anterior half largely brown, posteriorly with 1 anepisternal seta and longitudinally arranged setal row; katepisternum yellowish brown with 1 katepisternal seta and 2-5 short setulae in male, 7-10 long setulae in female; anepimeron largely yellowish brown, anteriorly with 1 anepisternal seta and 2-4 short setulae in male, 3-6 long setulae in female. Legs brownish yellow to yellowish brown; all femora basally with 1 long and slender dark brown ventral seta; female midfemur anteromedially with bare area; bare area not concave, brown; midtibial spur 0.62-0.68x as long as apical tibial width; hind femur with 4 long apicodorsal setae. Wing hyaline with yellowish brown patterns (Fig. 10G; pattern broader and darker in male); wing-thorax ratio 2.59-2.96, vein R_{4+5} ratio 0.43-0.51, vein M ratio 0.45-0.60; humeral and subcostal break present; Sc incomplete to C; vein R_{4+5} slightly curved; vein R_{2+3} subapically with short posteriorly directed spurious

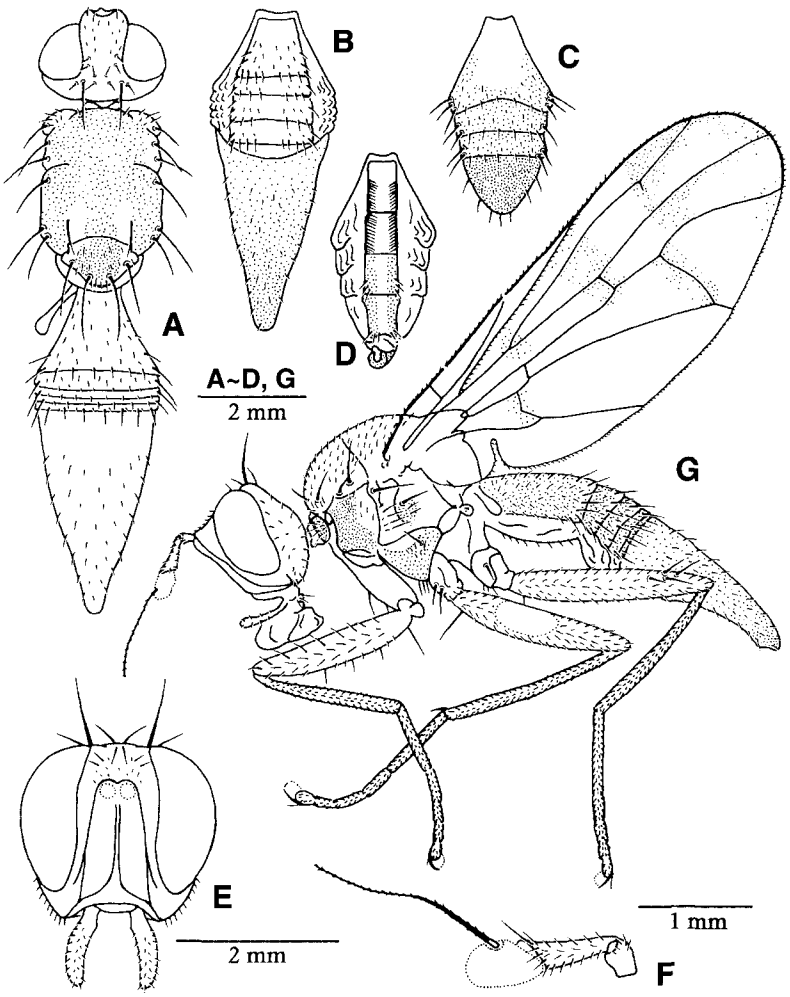


Fig. 10. *Adapsilia longifasciata* Kim et Han, sp. nov.: (A) body, dorsal view, ♀; (B) abdomen, ventral view, ♀; (C) abdomen, dorsal view, ♂; (D) abdomen, ventral view, ♂; (E) head, anterior view, ♀; (F) antenna, lateral view, ♀; (G) body, lateral view, ♀.

vein; cell bm, bcu entirely covered with microtrichiae.

Male abdomen (Figs 10C, D) reddish brown to dark brown; syntergite 1+2 1.5-1.8x as long as tergites 3-4 combined; 5th tergite 0.73-0.82x as long as syntergite 1+2, shiny black; sternite 2-3 laterally with conspicuous dense short black setae; genitalia (Figs 11A, E) with epandrium shiny reddish brown; hypandrium reddish brown to dark brown; medial surstylus with 2 short yellowish brown setulae.

Female abdomen (Figs 10A, B) yellowish brown to brown with dense setulae; syntergite 1+2 1.6-1.95x as long as tergites 3-6 combined; oviscape (Fig. 10B) shiny brownish yellow to yellowish brown with dense setulae; 1.5-1.53x as long as preabdominal tergites combined; aculeus (Fig. 11G) reddish brown; 2 spermathecae (Fig. 11H) dark brown, smooth; egg (Fig. 11F) narrowly elliptic in outline.

Type Specimens. Holotype ♂ [YSUW], GYEONGSANGNAM-DO, Jinju-si, Gajwa-dong, 9 V

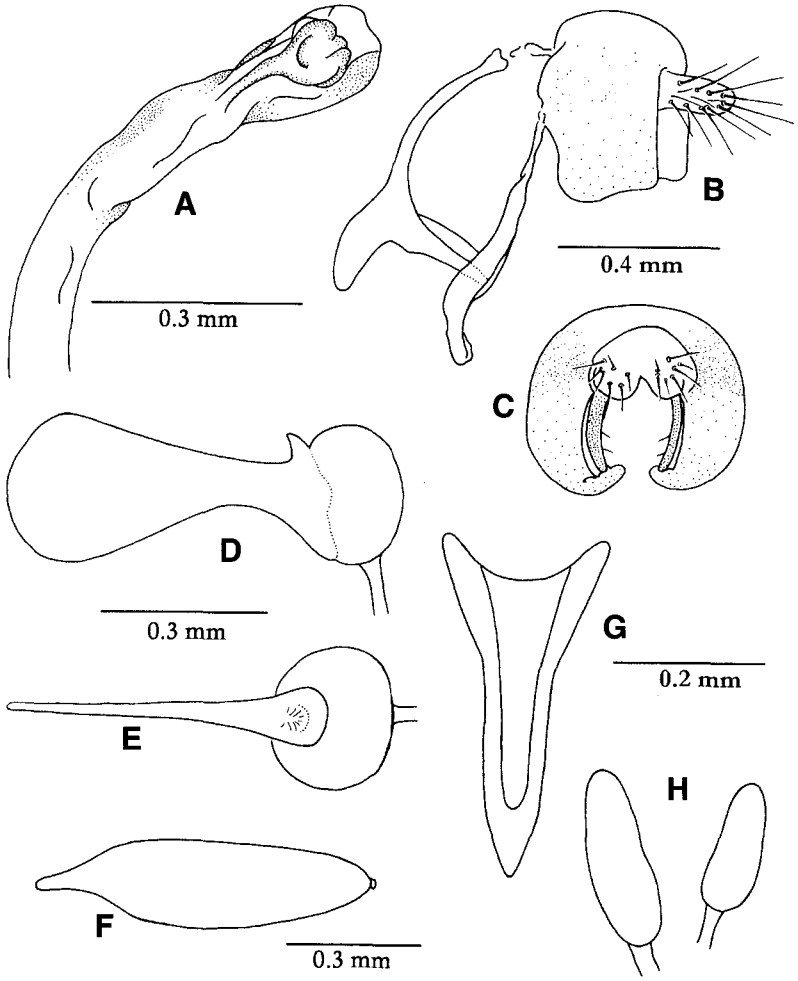


Fig. 11. *Adapsilia longifasciata* Kim et Han, sp. nov.: (A) glans, lateral view; (B) epandrial complex, lateral view; (C) epandrial complex, posterior view; (D) ejaculatory apodeme, lateral view; (E) ejaculatory apodeme, dorsal view; (F) egg, lateral view; (G) aculeus, dorsal view; (H) spermathecae.

1992. Paratypes: GYEONGSANGNAM-DO: [KSUJ] 1♀, Hamyang-gun, Baegjeon-myeon, Unsan-ri, Baegunsa, 23 V 1990; 2♀, Jinju-si, Gajwa-dong, 11 V 1990; 1♀, ditto, 1 VI 1990; 1♂, 3♀, ditto, 9 V 1992; 2♂, ditto, 20 V 1992. SEOUL: [CIS] 1♀, Kyunghee University, Seoul Campus, 14 IX 1973 (S.-W. Choi). The majority of the type series do not have collector's name.

Etymology. The specific epithet is derived from the Latin "longus" and "facies", referring their relatively long face.

Distribution. Korea.

Adapsilia ochrosoma Kim et Han, sp. nov. 황풍뎅이파리

(Figs 12A-G)

Diagnosis. This new species is similar to *A. longifasciata* sp. nov., but can be distinguished by the following combination of characteristics: 1) pleura entirely brownish yellow without any dark pattern; 2) antenna with first flagellomere transversely oblong in outline, not tapering toward apex (Fig. 12D); and 3) three spermathecae (Fig. 12E).

Description. Body entirely brownish yellow, except for reddish brown oviscape; all setae and setulae dark brown except for yellowish red setulae on tibiae and tarsi; mesonotum length 2.35 mm, wing length 6.9 mm. Head (Fig. 12C) brownish yellow; frontal-head ratio 0.32, eye ratio 0.64, genal-eye ratio 0.29; first flagellomere-pedicel ratio 1.22; aristal-antennal ratio 1.00; medial vertical seta 0.54x as long as longest diameter of eye; lateral vertical seta 0.37x as long as medial vertical seta; postocellar seta 0.57x as long as medial vertical seta; paravertical seta reduced; ocellar seta 0.40x as long as medial vertical seta; 1 orbital seta; frons brownish yellow to yellow; antenna (Fig. 12D) brownish yellow; flagellomere yellowish brown, transversely oblong, not tapering toward apex; arista yellowish brown with microscopic pubescence; face brownish yellow; antennal foveae concave with sharply raised median carina; median carina 0.94x as long as facial length; gena brownish yellow; genal seta 0.5x as long as medial vertical seta; palpi brownish yellow. Thorax (Fig. 12A) brownish yellow ground color; postpronotal lobe brownish yellow with 1 postpronotal seta and 8-10 setulae; scutum brownish yellow with 2 dorsocentral setae; thoracic stripe indistinct, slightly darker than ground color; scutellum brownish yellow with sparsely covered with short setulae; apical and basal scutellar seta 2.0x as long as scutellum; pleura (Fig. 12G) brownish yellow; proepisternum yellowish brown with 2 long setulae and 7-8 short setulae, proepisternal seta absent; anepisternum brownish yellow, posteriorly with 1 anepisternal seta and longitudinally arranged setulae; katepisternum brownish yellow with 1 katepisternal seta and 5 short setulae; anepimeron brownish yellow, anteriorly with 1 anepisternal seta and 4 setulae. Legs brownish yellow ground color with tibiae and tarsi yellowish brown; all femora basally with 1 long, dark brown ventral seta; fore femur brownish yellow, ventrally with moderate sized setal row; midfemur with anteromedially with bare area in female; bare area concave, brown; midtibial spur 0.7x as long as apical tibial width; hind femur with 6 long apicodorsal setae. Wing hyaline with brownish yellow patterns; wing-thorax ratio 2.94, vein R_{4+5} ratio 0.47, vein M ratio 0.5; humeral and subcostal break present; Sc incomplete to C; R_{2+3} subapically with short posteriorly directed spurious vein; cell bcu, bm entirely covered with microtrichiae.

Female abdomen (Figs 12A, B) brownish yellow ground color with dense setulae; syntergite 1+2 2.27x as long as tergites 3-6 combined; oviscape (Fig. 12B) shiny reddish brown, 1.44x as long as preabdominal tergites combined; aculeus (Fig. 12F) brown; 3 spermathecae (Fig. 12E) yellowish brown, smooth.

Type Specimen. Holotype ♀ [YSUW], GYEONGSANGNAM-DO, Uiryeong-gun, Garye-myeon, Gabeul-ri, Mt. Jeogolsan, 26-27 VII 1990 (J.-S. Jeon); abdomen dissected and kept in a genitalia vial.

Etymology. The specific name is derived from the Greek "ochros" and "soma", referring the pale yellowish body.

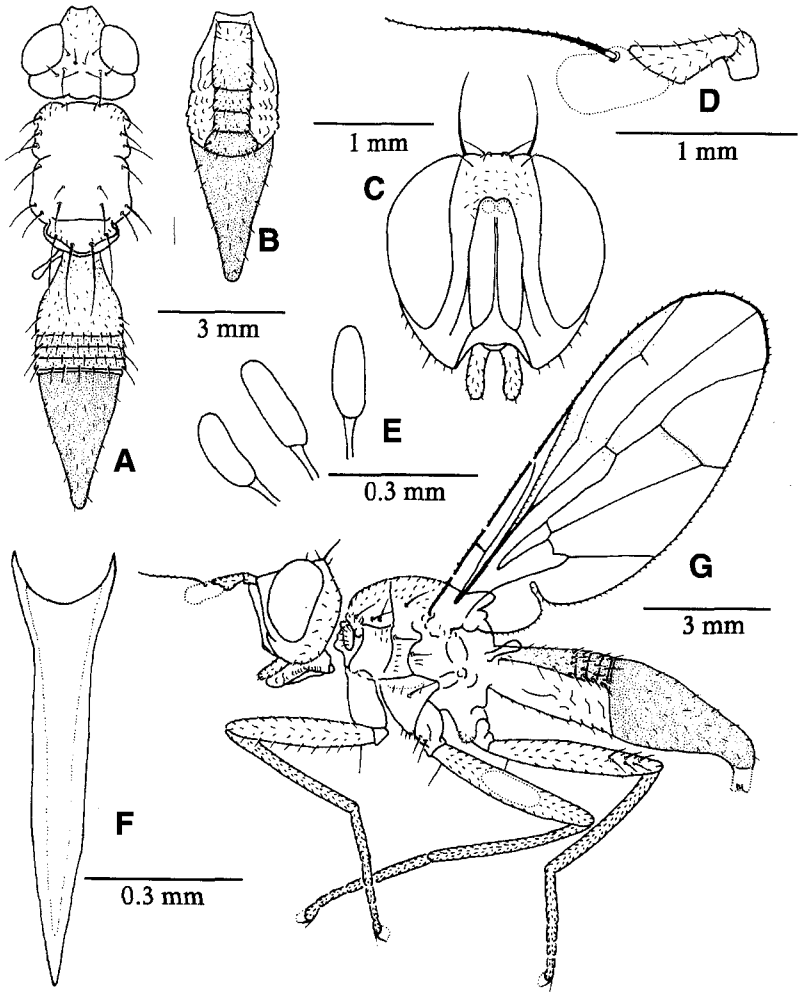


Fig. 12. *Adapsilia ochrosoma* Kim et Han, sp. nov., ♀: (A) body, dorsal view; (B) abdomen, ventral view; (C) head, anterior view; (D) antenna, lateral view; (E) spermathecae; (F) aculeus, dorsal view; (G) body, lateral view.

Distribution. Korea.

***Adapsilia tenebrosa* Kim et Han, sp. nov.** 검정풍뎅이파리

(Figs 13A-J)

Diagnosis. This new species can be readily distinguished from any other *Adapsilia* species by the following combination of characteristics; 1) arista thickened basal 1/4 and very thin apically (Fig. 13D); 2) gena exceptionally broad, 0.74x as long as longest diameter of eye; and 3) postocellar seta absent.

Description. Body yellowish brown ground color with dark brown to black patterns; all setae and setulae dark brown except for yellowish red setulae on tibiae and tarsi; mesonotum length 2.2 mm, wing

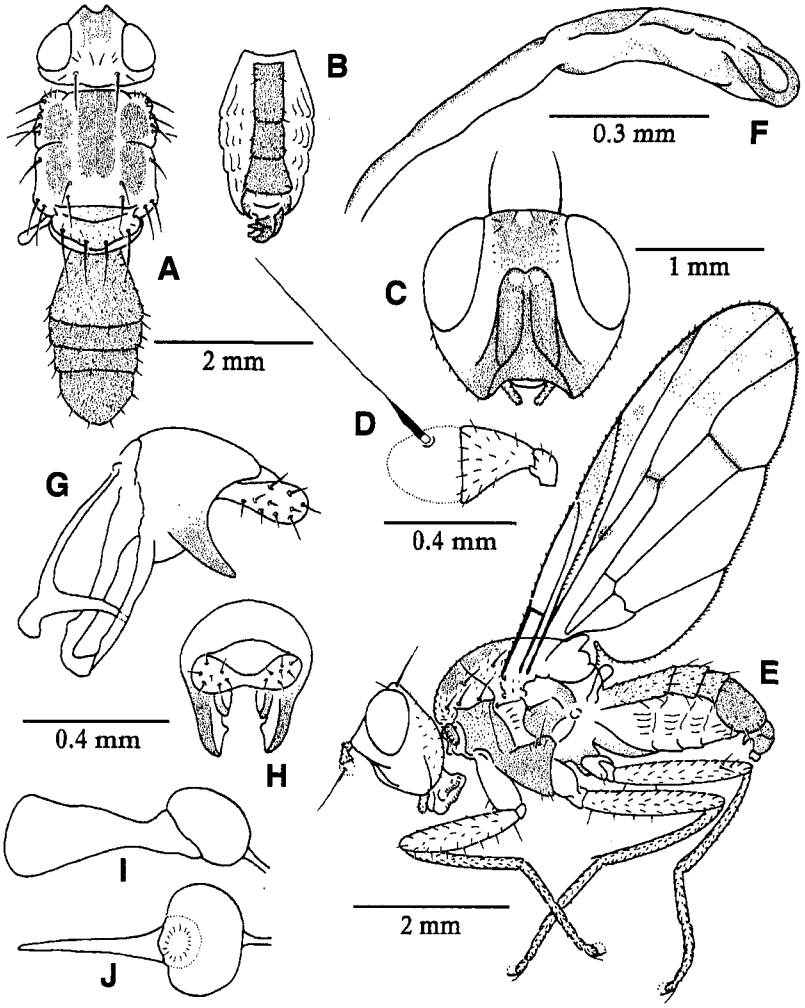


Fig. 13. *Adapsilia tenebrosa* Kim et Han, sp. nov., ♀: (A) body, dorsal view; (B) abdomen, ventral view; (C) head, anterior view; (D) antenna, lateral view; (E) body, lateral view; (F) glans, lateral view; (G) epandrial complex, lateral view; (H) epandrial complex, posterior view; (I) ejaculatory apodeme, lateral view; (J) ejaculatory apodeme, dorsal view.

length 6 mm. Head (Fig. 13C) brownish yellow with dark brown to black patterns; frontal-head ratio 0.36, eye ratio 0.74, genal-eye ratio 0.74; first flagellomere-pedicel ratio 1.0; aristal-antennal ratio 1.27; medial vertical seta 0.61x as long as longest diameter of eye; lateral vertical seta poorly developed, slightly longer than nearby setulae; postocellar seta absent; paravertical seta reduced; ocellar seta 0.48x as long as medial vertical seta; 1 orbital seta, poorly developed; frons brownish yellow, medially with broad dark brown pattern; antenna (Fig. 13D) brown; first flagellomere as long as wide in lateral view; arista dark brown, basal 1/4 thickened and rest very slender, bare; face yellowish brown; antennal foveae moderately concave with median carina; median carina 0.83x as long as facial length; gena yellowish

brown to dark brown; genal seta indistinguished from nearby setuale; palpi yellowish brown, short. Thorax (Fig. 13A) brownish yellow ground color with dark brown patterns; postpronotal lobe brownish yellow with 1 postpronotal seta and 5-7 setulae; scutum brownish yellow with 1 presutural supra-alar seta, 2 dorsocentral setae; AS dark brown, merged with SSS, ending at half way between transverse and scutoscutellar sutures; AD dark brown, widely ovate; DS dark brown, ending slightly before posterior dorsocentral seta; scutellum brownish yellow, sparsely covered with short setulae, medially yellowish brown; apical scutellar seta 1.36x as long as scutellum; basal scutellar seta 1.27x as long as scutellum; pleura (Fig. 13E) brownish yellow with largely occupied by brown to dark brown patterns; proepisternum reddish brown with 6-8 long setulae, proepisternal seta absent; anepisternum brownish yellow, anteriorly with entirely brown, posteriorly with 1 anepisternal seta and longitudinally arranged short setulae; katepisternum dark brown with 1 katepisternal seta and 3-4 short setulae; anepimeron largely brown, anteriorly with 1 anepisternal seta and 1 setulae. Legs yellowish brown; all femora basally with 1 long and slender dark brown ventral seta; fore femur dark brown, ventrally with moderately sized setal row; midtibial spur 0.87x as long as apical tibial width; hind femur with 3 long apicodorsal setae. Wing hyaline with brown patterns (Fig. 13E); wing-thorax ratio 2.73, vein R_{4+5} ratio 0.43, vein M ratio 0.69; humeral and subcostal break present; Sc incomplete to C; cell bcu, bm entirely covered with microtrichiae; cross vein DM-Cu completely straight

Male abdomen (Figs 13A, B) brown to dark brown; syntergite 1+2 1.46x as long as tergites 3-4 combined; tergite 5 dark brown, 0.79x as long as syntergite 1+2; genitalia (Figs 13F-J) with epandrium shiny reddish brown; hypandrium reddish brown; cerci yellowish brown with short setulae; surstylus more or less protruding.

Type Specimen. Holotype ♂ [YSUW], GANGWON-DO, Wonju-si, Heungeob-myeon, Maeji-ri, Yonsei Univ. campus, mercury and black light trap, 12 V 1999 (S.-K. Kim & C.-H. Park).

Etymology. The specific epithet is derived from the Latin "tenebrosus", meaning dark, referring their relatively dark body color.

Distribution. Korea.

Genus *Parageloemyia* Hendel, 1934

Parageloemyia Hendel 1934: 142. Type-species: *Geloemyia quadriseta* Hendel, by original designation.

Diagnosis. Small sized flies with well-developed chaetotaxy and wing pattern. This genus can be readily distinguished by the following combination of characteristics: 1) slender and cornical ovipositor with dark apex; 2) acrostichal and presutural supra-alar setae always present; 3) dorsocentral seta always three pairs in both sexes; and 3) humeral break clearly visible, subcostal break absent.

Parageloemyia nigrofasciata (Hendel) 끝검정풍뎅이파리

(Figs 14A-G, 15A-I, 28)

Geloemyia nigrofasciata Hendel 1933: 13 (Holotype, ♂, China: Suifu, Szechuan, col. D.C. Graham, USNM); Soó 1984: 37.

Parageloemyia nigrofasciata: Chen, 1947: 55; Shi 1996: 577.

Diagnosis. This species can be readily distinguished from other pyrgotid species by the following combination of characteristics; 1) well-developed presutural supra-alar seta (fig. 14A); 2) oviscape apically black (Figs 14A, B); 3) fore tarsus with tarsomere 4-5 broad in female (Fig. 14G); and 4) vein R_{4+5} with macrotrichiae (Fig. 14G).

Description. Body brownish yellow ground color with reddish yellow to reddish brown patterns; setae and setulae black; mesonotum length 1.95-2.55 mm, wing length 5.6-7.6 mm. Head (Fig. 14E) reddish yellow with frontal-head ratio 0.36-0.45, eye ratio 0.63-0.70, genal-eye ratio 0.55-0.63 in male, 0.36-0.52 in female, aristal-antennal ratio 0.93-1.29, medial vertical seta 0.77-0.95x as long as longest diameter of eye; outer vertical seta 0.55-0.65x as long as medial vertical seta in male, 0.47-0.51x in female; postocellar seta 0.37-0.51x as long as medial vertical seta; paravertical seta reduced, slightly longer than nearby setulae; ocellar seta 0.23-0.43x as long as medial vertical seta; 1 orbital seta; frontal seta absent; frons reddish yellow to reddish brown with sparse fine setulae; antenna (Fig. 14F) yellow to reddish yellow; first flagellomere-pedicel ratio 0.86-1.0 in dorsal view; first flagellomere apically rounded with brownish yellow to reddish yellow pruinosity; arista with microscopic pubescence; eye elliptic in outline; face hyaline to reddish yellow; antennal foveae deeply concave without median carina, 0.74-0.84x as long as facial length; gena, postgena reddish yellow; occiput reddish yellow to brownish yellow with short supracervical setae, laterally with 1 conspicuous occipital seta; mouth parts pale yellow with yellowish brown setuale; palpi yellow to reddish yellow ground color with long setulae in male, sparse short setulae in female. Thorax (Fig. 14A) reddish yellow to brownish yellow with brown to reddish brown patterns; postpronotal lobe pale yellow to brownish yellow with 1 postpronotal seta and 4-8 setulae; scutum with 1 presutural supra-alar, 3 dorsocentral, 1 acrostichal seta, 1 scapular seta; round dark brown spot beneath presutural supra-alar seta; AS reddish brown, merged with SSS; SSS reddish brown, ending slightly beyond anterior dorsocentral seta; AD reddish brown, round; DS reddish brown, slightly oblique laterally, ending at level of posterior dorsocentral seta; scutellum pale yellow to brownish yellow, bare; apical scutellar seta 1.83-2.88x as long as scutellum; basal scutellar seta 1.58-2.50x as long as scutellum; pleura (Fig. 14G) pale yellow to reddish yellow; proepisternum with 2-7 moderately long setuae; anepisternum with 1 anepisternal seta, 2-4 long setulae and realtively short setulae; katepisternum with 1 katepisternal seta and 2-6 setulae, ventrally with relatively long setulae; anepimeron entirely bare with 1 anepimeral seta; katepimeron pale yellow to reddish yellow. Legs pale yellow to brownish yellow; fore femur brownish yellow with erect setulae, posteriorly with 3 dorsal setae, ventrally with relatively long setal row; fore tarsus with tarsomere 4-5 1.7-2x as long as tarsomere 1 in male; midfemur with short dense setulae, medially with oval bare area; bare area not concave; midtibial spur 0.83-0.90x as long as apical tibial width; hind femur with 2-5 apicodorsal setae. Wing hyaline with extensive brown band (Fig. 14G; wing band broader and darker in males); wing-thorax ratio 2.77-3.05, vein R_{4+5} ratio 0.26-0.40, vein M ratio 0.63-0.79; humeral break present, subcostal break absent; Sc incomplete to C; cell bcu, bm, covered with microtrichiae; vein R_{4+5} with macrotrichiae; halter yellow.

Male abdomen (Figs 14C, D) yellowish brown ground color with dense setulae, laterally with long setulae; syntergite 1+2 1.8x as long as tergites 3-4 combined; tergite 5 with 0.64-0.7x as long as syntergite 1+2; genitalia (Figs 15E-H) with epandrium dark brown; hypandrium dark brown; aedeagal apodeme dark brown; ejaculatory apodeme pale brown, fan-shaped; paired cerci grayish yellow with

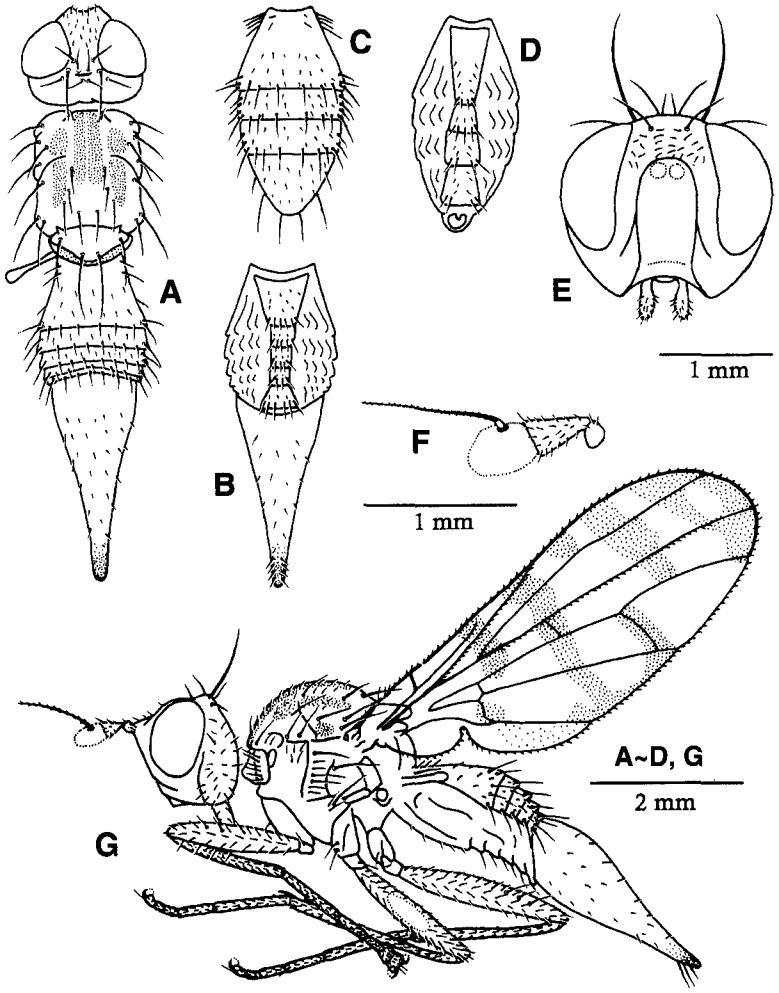


Fig. 14. *Parageloemyia nigrofasciata* Hendel: (A) body, dorsal view, ♀; (B) abdomen, ventral view, ♀; (C) abdomen, dorsal view, ♂; (D) abdomen, ventral view, ♂; (E) head, anterior view, ♀; (F) antenna, lateral view, ♀; (G) body, lateral view, ♀.

relatively short sparse setulae; surstylus dark brown with distinctly protruding forward.

Female abdomen (Figs 14A, B) reddish yellow to brownish yellow; syntergite 1+2 with 1.54–2.35x as long as tergites 3–6 combined; tergites 5–6 short, sometimes invisible in dorsal view; oviscape (Fig. 15A) brownish yellow with short dense setulae, tapering toward apex; 1.59–2x as long as preabdominal tergites combined; apex black with 3–4 pairs fairly long and stout ventral setal row; aculeus (Fig. 15B) dark brown; 3 spermathecae (Fig. 15C) yellowish brown, smooth; egg (Fig. 15D) oblanceolate in outline.

Specimens examined. GANGWON-DO: Wonju-si: [YSUW] 1♀, Gwirae-myeon, Wungye-ri, Baegunryung motel, black & mercury vapor light trap, 5 VII 1996 (H.-Y. Han & H.-W. Byun); 1♂, 3 ♀, Heungeob-myeon, Mt. Deoggasan, black & mercury vapor light trap, 16 VI 1997 (H.-W. Byun); 1 ♂, Heungeob-myeon, Maeji-ri, Yonsei Univ. campus, collected from mercury vapor light, 8 VI 1999

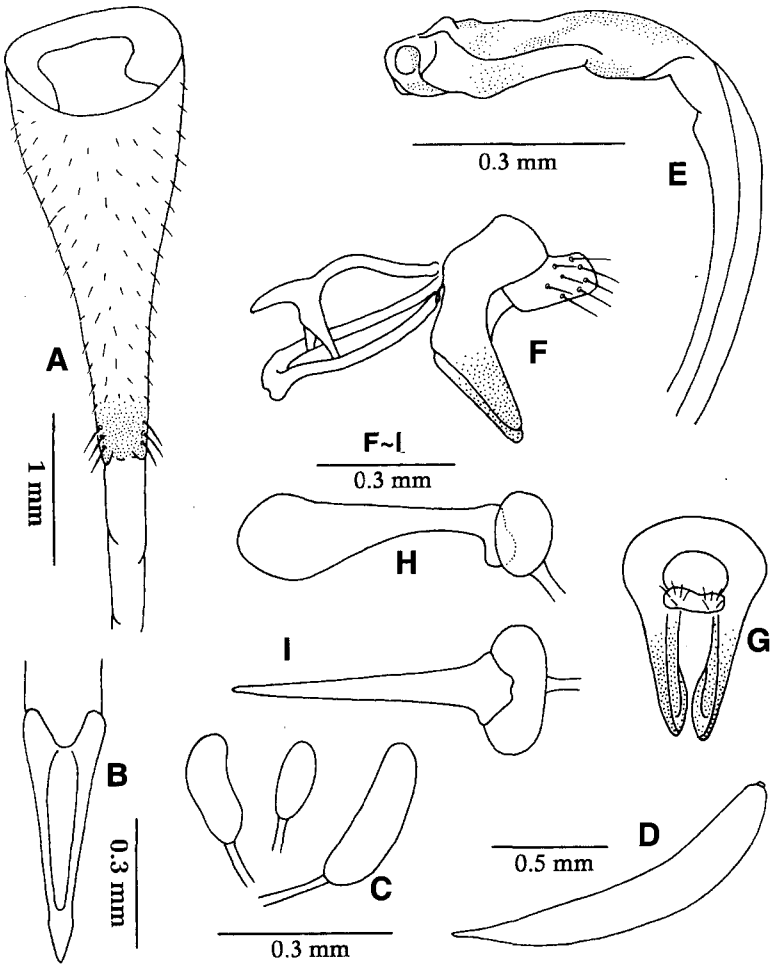


Fig. 15. *Parageloemyia nigrofasciata* Hendel: (A) oviscape, ventral view; (B) aculeus, dorsal view; (C) spermathecae; (D) egg, lateral view; (E) glans, lateral view; (F) epandrial complex, lateral view; (G) epandrial complex, posterior view; (H) ejaculatory apodeme, lateral view; (I) ejaculatory apodeme, dorsal view.

(S.-K. Kim & D.-W. Kim); 2♀, ditto, 10 VI 1999 (S.-K. Kim & D.-W. Kim); 1♂, 1♀, ditto, 12 VI 2000 (S.-K. Kim). Yanggu-gun: [SSUK] 1♀, Yanggu-eup, 12 VI 1990 (J.-I. Kim). GYEONGSANG-NAM-DO: [YSUW] 1♂, Uiryeong-gun, Garye-myeon, Gabeul-ri, Mt. Jeogolsan, 20 V 1990; 2♀, Geoje-si, Dongbu-myeon, Mt. Nojasan, 4 VI 1997 (D.-S. Ku); [KSUJ] 1♂, Hapcheon-gun, Gaya-myeon, Jukjeon-ri, Mt. Gayasan, 22 V 1999 (K.-R. Han); 1♀, Jinju-si, Gajwa-dong, Mercury and black light, 22 IX 1989; 1♀, Jinseong-myeon, Gajin-ri, Mt. Wolasan, 21 V 1999 (J.-S. Jeon); 1♀, ditto (J.-H. Moon); 1♂, ditto (S.-H. Kang); 1♂, 1♀, Masan-si, Hoewon-gu, Hapseong 2-dong, Mt. Palryongsan, 5 VI 2000 (S.-H. Paek); 1♀, Sancheong-gun, Sancheong-eup, Yulhyeon-ri, Mt. Jeongsusan, 24 V 1998; [YSUW] 1♀, Sicheon-myeon, Jungsan-ri, 5 VI 1997 (D.-S. Ku). SEOUL: [YSUW] 1♀, Jung-gu, Mt. Namsan, Seoul tower, 3 VI 2001 (H.-W. Byun).

Distribution. Korea, China.

***Parageloemyia wonjuensis* Kim et Han, sp. nov.** 원주풍뎅이파리

(Figs 16A-G, 17A-H, 29)

Diagnosis. This species can be readily distinguished from other pyrgotid species by the following combination of characteristics; 1) Wing largely mottled with dark patterns (Fig. 16G); 2) a pair of acrosthichal setae and a pair of presutural supra-alar setae always present; 3) vein R4+5 without macrotrichiae; and 4) oviscape apically black.

Description. Body yellowish brown with brown to dark brown patterns; setae and setulae black; mesonotum length 2.1-2.55 mm, wing length 7.0-8.5 mm. Head (Fig. 16E) reddish yellow ground color with brown to dark brown areas; frontal-head ratio 0.36-0.41, eye ratio 0.71-0.77, genal-eye ratio 0.31-0.42; aristal-antennal ratio 1.12-1.35, first flagellomere-pedicel ratio 0.7-1.17; medial vertical seta 0.72-0.87x as long as longest diameter of eye; outer vertical seta 0.5-0.59x as long as medial vertical seta; postocellar seta 0.44-0.54x as long as medial vertical seta; paravertical seta reduced to hair-like; ocellar seta 0.44-0.51x as long as medial vertical seta; 2 orbital setae; frons reddish yellow to reddish brown; antenna (Fig. 16F) brownish yellow to reddish brown; first flagellomere apically rounded with reddish brown pruinosity; arista with microscopic pubescence; eye elliptic in outline; face dark brown to shiny black in male, brownish yellow in female; antennal foveae deeply concave with median carina; median carina not clearly marginated, 0.66-0.69x as long as facial length; gena reddish yellow; genal seta as long as first flagellomere in dorsal view. Thorax (Fig. 16A) yellowish brown ground color with brown patterns; postpronotal lobe pale yellow with 1 postpronotal seta and 3-7 setulae; scutum with 1 presutural supra-alar, 3 dorsocentral, 1 acrostichal, 1 scapular setae; AS dark brown, merged with SSS; SSS dark brown, ending at little beyond medial dorsocentral seta; AD round, dark brown; DS dark brown, ending at level of posterior dorsocentral seta; scutellum bare, brownish yellow ground color, medially yellowish brown; apical scutellar seta 2.17-2.89x as long as scutellum, basal scutellar seta as long as apical scutellar seta; pleura (Fig. 16G) brownish yellow ground color with brown patterns; proepisternum yellowish brown with 2-3 setae and setulae; anepisternum entirely yellowish brown with 1 anepisternal seta and moderately long setulae; katepisternum largely yellowish brown with 1 katepisternal seta and moderately long setulae, ventrally with 3 long setae; anepimeron yellowish brown with 1 anepimeral seta and 1 long setulae. Legs slender, brownish yellow ground color; fore femur covered with erect setulae, basally with 1 long and slender dark brown ventral seta; ventrally with slender and long setal row, with 2-3 apicodorsal setae; midtibial spur 0.85-1.25x as long as apical tibial width; hind femur with 2-3 conspicuous apicodorsal setae. Wing (Figs 16G, 29) hyaline with extensive brown pattern; wing-thorax ratio 3.22-3.38, vein R_{4+5} ratio 0.32-0.42, vein M ratio 0.69-0.86; humeral break present, subcostal break absent; Sc incomplete to C; cells bcu and bm covered with microtrichiae.

Male abdomen (Figs 16C, D) yellowish brown with dense setulae; syntergite 1+2 1.3x as long as tergite 3-4 combined; tergite 5 as long as tergite 3-4 combined; genitalia (Figs 17D-H) with epandrium brownish yellow; hypandrium brown; aedeagal apodeme dark brown; ejaculatory apodeme yellowish brown, fan-shaped; cerci separated at base, apparently fused at apex; surstylus brownish yellow,

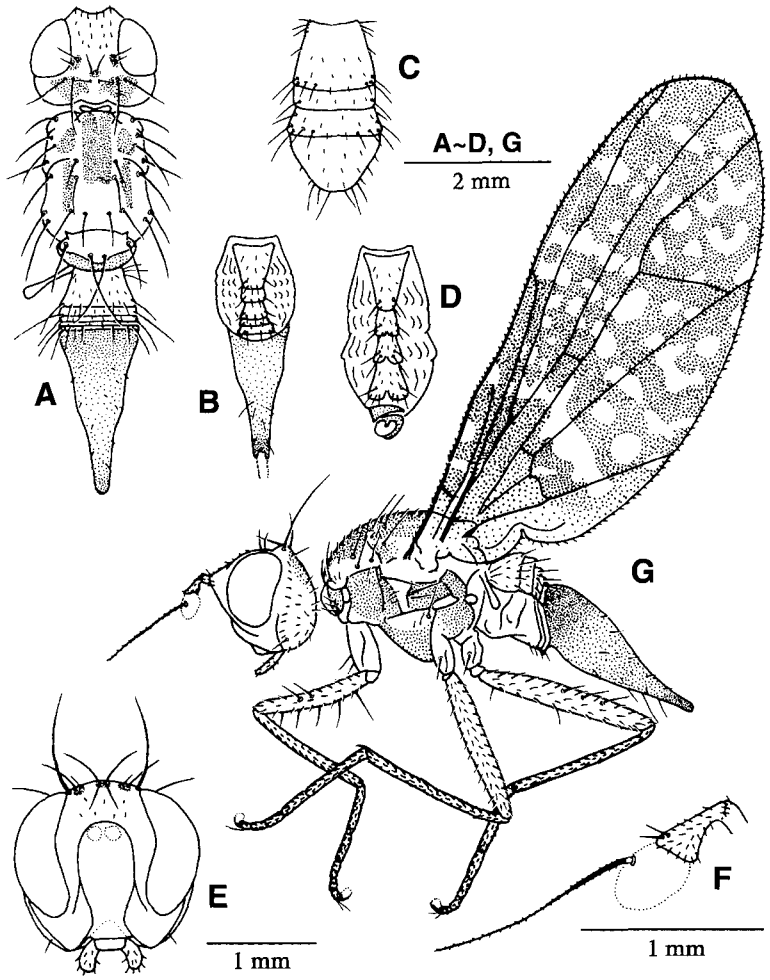


Fig. 16. *Parageloemyia wonjuensis* Kim et Han, sp. nov.: (A) body, dorsal view, ♀; (B) abdomen, ventral view, ♀; (C) abdomen, dorsal view, ♂; (D) abdomen, ventral view, ♂; (E) head, anterior view, ♀; (F) antenna, lateral view, ♀; (G) body, lateral view, ♀.

distinctly protruding forward.

Female abdomen (Figs 16A, B) yellowish brown with relatively long lateral setulae; syntergite 1+2 1.18-3.28x as long as tergites 3-6 combined; tergite 5 and 6 short; oviscape (Fig. 17A) 1.6-2.1x as long as preabdomen, shiny reddish brown ground color with basal area shiny dark brown, bare, and with apex brownish black with long and slender reddish brown ventral subapical setae; aculeus (Fig. 17B) reddish brown; 3 spermathecae (Fig. 17C) yellowish brown, smooth.

Type Specimens. Holotype ♂ [YSUW], GANGWON-DO, Wonju-si, Heungeob-myeon, Maeji-ri, Yonsei Univ. campus, black & mercury vapor light trap, 2 V 2000 (S.-K. Kim & C.-H. Park). Paratypes: [YSUW] 1♂, 2♀, same locality as holotype, 30 IV 1999; 5♀, ditto, 4 V 1999 (S.-K. Kim & C.-H. Park); 1♀, ditto, collected from mercury vapor light, 10 V 1999 (S.-K. Kim); 2♀, ditto, black

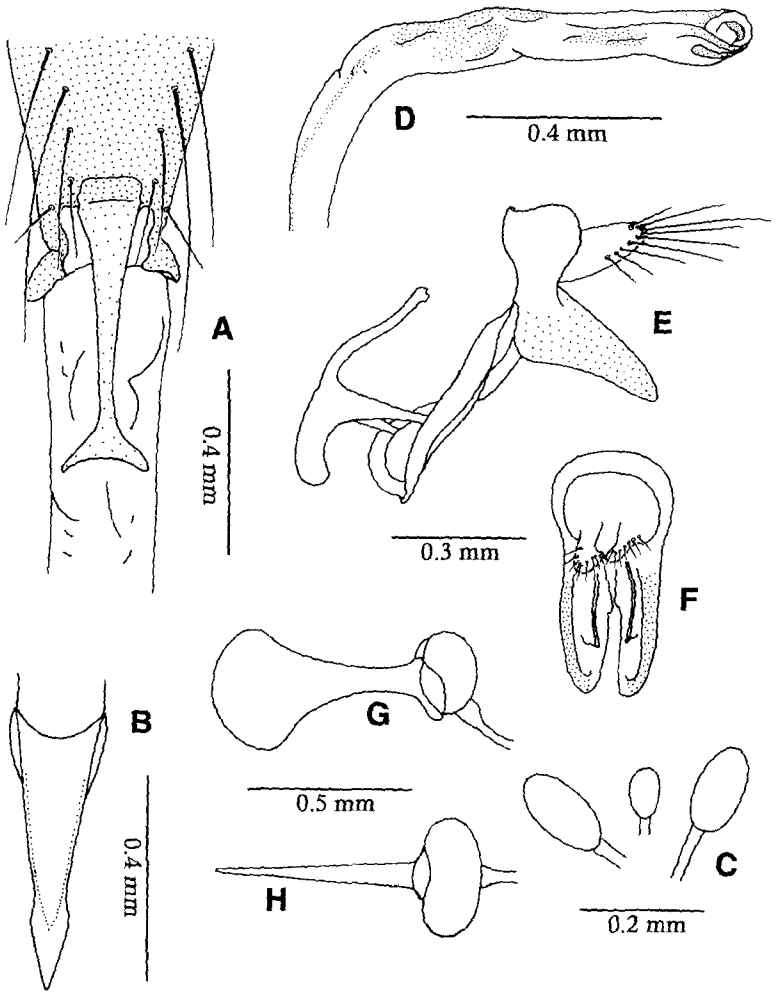


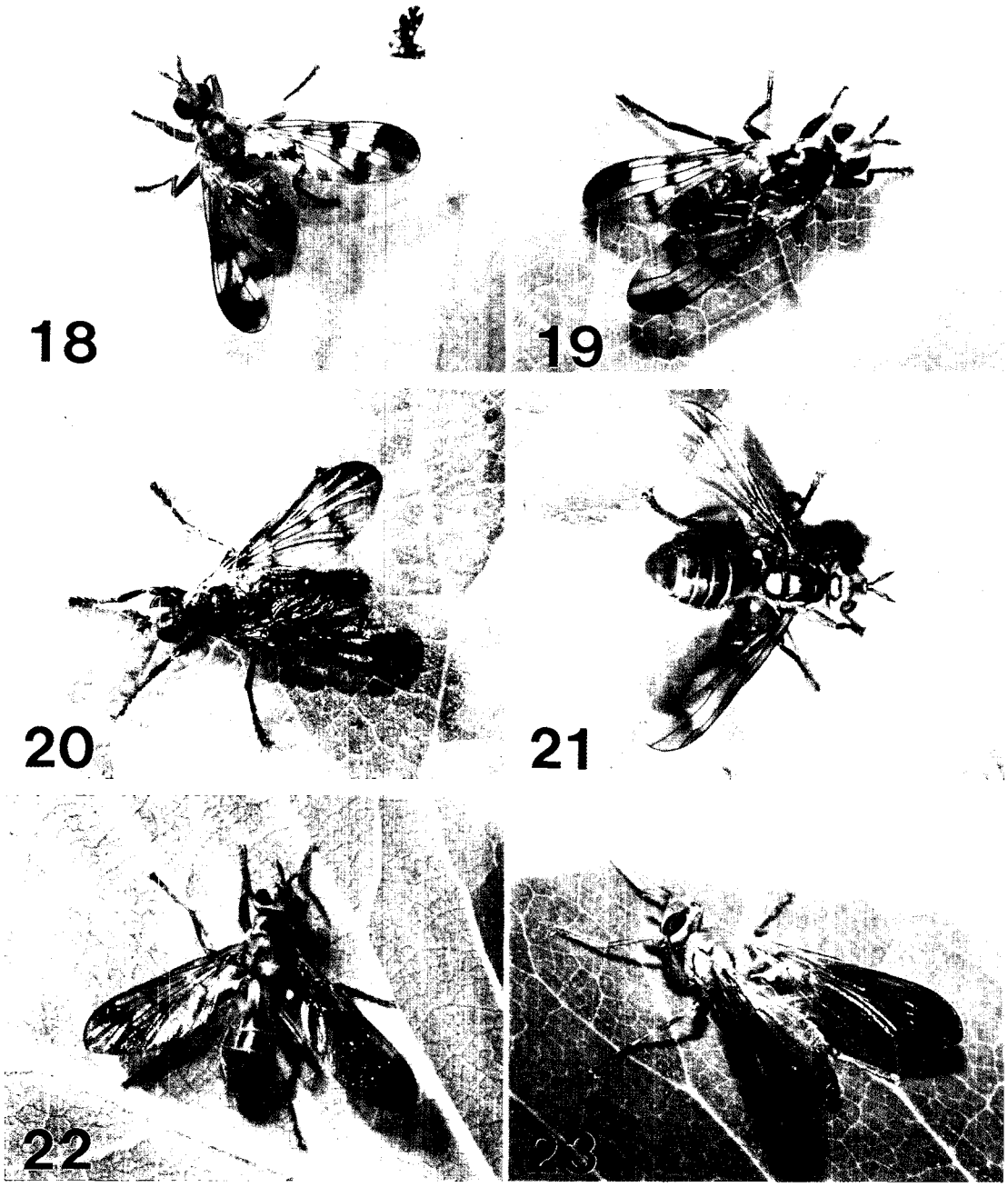
Fig. 17. *Parageloemyia wonjuensis* Kim et Han, sp. nov.: (A) oviscape, ventral view; (B) aculeus, dorsal view; (C) spermathecae; (D) glans, lateral view; (E) epandrial complex, lateral view; (F) epandrial complex, posterior view; (G) ejaculatory apodeme, lateral view; (H) ejaculatory apodeme, dorsal view.

& mercury vapor light trap, 11 V 1999 (S.-K. Kim & C.-H. Park); 2♂, 5♀, ditto, 28 IV 2000 (S.-K. Kim); 4♀, ditto, 29 IV 2000 (S.-K. Kim); 7♀, ditto, 2 V 2000 (S.-K. Kim & C.-H. Park); 1♀, ditto, 14 V 2001 (S.-K. Kim & O.-Y. Lim). GYEONGSANGNAM-DO: Hapcheon-gun: 2♂, Gahoe-myeon, Dunnae-ri, Mt. Hwangmaesan, black light trap, 25 IV 1998. JEOLLANAM-DO: Gwangyang-si: [UIB] 1♂, Mt. Baegunsan, 70% EtOH to chloroform, 4 V 1998 (M.-K. Paek *et al.*).

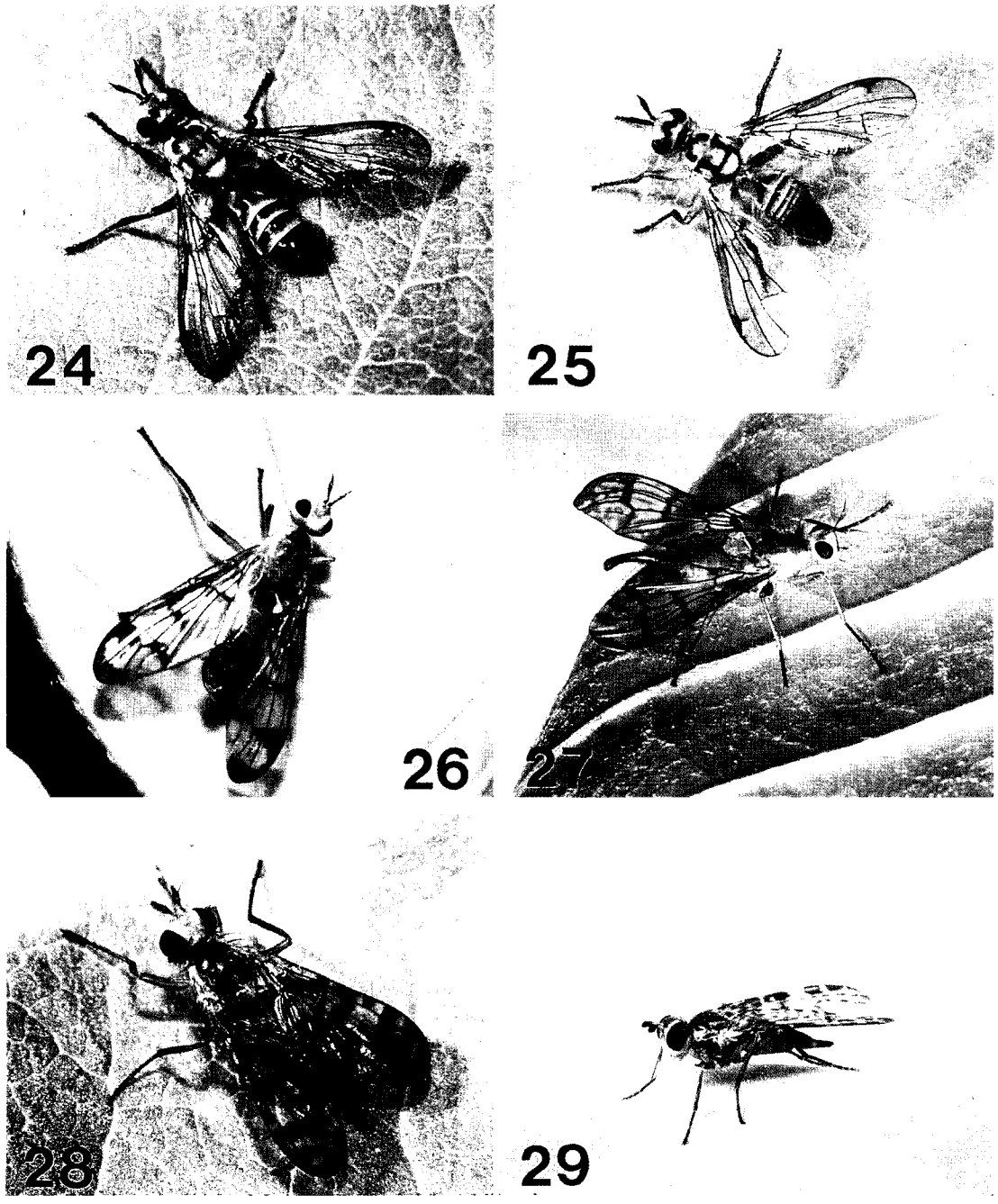
Etymology. This specific name is derived from the type locality (Yonsei University, Wonju Campus), where the majority of the type series were collected.

Distribution. Korea.

Remarks. Even though this species lacks the previously recognized diagnistic character of the genus *Parageloemyia* (vein R_{4+5} with macrotrichiae), we regard it as a congener based on the phylogenetic



Figs 18-23. 18, *Adapsilia coarctata* Waga, 긴뿔풍뎅이파리 ♂; 19, *Adapsilia cornugaster* Kim et Han, sp. nov., 엉덩뿔풍뎅이파리 ♂; 20, ditto, ♀; 21, *Eupyrgota luteola* Coquillett, 큰풍뎅이파리 ♀; 22, *Eupyrgota rufosetosa* Chen, 노랑털풍뎅이파리 ♂; 23, ditto, ♀. Photographed by H.-Y. Han.



Figs 24-29. 24, *Eupyrgota tigrina* Kim et Han, 호랑풍뎅이파리 ♂; 25, ditto, ♀; 26, *Paradapsilia trinotata* Chen, 긴꼬리풍뎅이파리 ♂; 27, ditto, ♀; 28, *Parageloemyia nigrofasciata* Hendel, 끝검정풍뎅이파리 ♀; 29, *Parageloemyia wonjuensis* Kim et Han, sp. nov., 원주풍뎅이파리 ♀. Photographed by H.-Y. Han.

analysis (see "Phylogenetic Relationships").

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